ON SPINAL ANAESTHESIA BY STOVAINE.

WITH REMARKS ON 1,000 CASES.

BY

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With Notes by

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FOR rather more than four years it has been our custom at Kasr-el-Ainy Hospital to employ spinal anaesthesia whenever possible; and we have thus arrived at certain definite conclusions with regard to the efficacy of this method of anaesthesia, and, what is perhaps more important, its limitations. Such conclusions drawn from a large number of cases may be interpreted in different ways by different observers, and I am anxious, therefore, to supplement the excellent paper of my colleague, Mr. Owen Richards, published in the BRITISH MEDICAL JOURNAL of December 23rd, 1911, by some remarks based upon an experience of 1,000 operations performed in my section under stovaine anaesthesia; a series to be followed in the near future, I believe, by yet another 1,000 special operations from the section of our gynaecological colleague, Dr. Dobbin.

In all that concerns the general application and the technique of the method and its evident advantages and disadvantages, Mr. Richards's paper leaves but little to be said; and I will therefore confine myself to a personal record of my experience in the hope that some new points of interest may be elicited.

The Preparation of Stovaine Employed.

My first cases were anaesthetized by the well-known stovaine and adrenaline solution of Billon (epirenine borate 0.0026, stovaine 0.08, sodium chloride 0.0022, water to 2.00). Of this nearly the whole ampoule is injected in operations on the lower extremities and lower abdomen; but the dose is considerably reduced in operations in and around the perineum, and especially piles and fistulae and perineal operations for stone. For suprapubic cystotomy and lithotrities the larger dose is required; and also in hydrocele, which, though not a severe operation, is often attended with some pain on handling the testicle; this pain may also be present in operations for herniae, especially when any drag is exercised on the neck of a hernial sac prior to its ligature. In growing boys and girls and in old people, particularly when suffering from arterio-sclerosis, the dose must be proportionately reduced.

After the publication of Jonnesco's results in the BRITISH MEDICAL JOURNAL of November 14th, 1909, I had his solutions made up for me by Messrs. Parke, Davis and Co. in ampoules; and with these I obtained the best results I have ever had. This was probably due to the freshness of the preparations. With them I was able steadily to reduce the dose of the stovaine until I was obtaining quite perfect results with low anaesthesia when using the weaker solutions that were only intended for high anaesthesia. With these solutions I also carried out a short series of twelve cases of cervical anaesthesia—of which I sent a note to the BRITISH MEDICAL JOURNAL of September 24th, 1910—but I do not propose to repeat the experience, as it seems to me quite unnecessarily dangerous.

The most generally applicable Jonnesco solution was that containing stovaine 0.10, strychnine 0.001, water to 1.0, the dose being modified as above described, and the injection being made in the upper part of the lumbar spine or in the space between the last dorsal and the first lumbar vertebra.

When my supply of ampoules was exhausted we had the same solutions made locally, but they were not at all satisfactory, many ampoules failing to produce any anaesthesia at all, and when they did, it was hardly possible to finish a comparatively short operation before sensation returned.

In order to simplify matters from an administrative point of view we decided to adopt the Billon preparation, and this has been the only solution used latterly at Kasr-el-Ainy Hospital; but I am nevertheless of opinion that freshly prepared Jonnesco solution of the above-mentioned formula is the most generally satisfactory.

It is probable, nay, almost certain, that neither the strychnine or the adrenaline are necessary; but undoubtedly, after brandy has been tried and proved ineffective, the best treatment for the sudden faintness and collapse sometimes seen after a stovaine injection is a hypodermic injection of 5 to 10 minims of a 1 in 1,000 adrenaline chloride solution. If a further stimulant is necessary 5 minims of a 1 per cent. solution of strychnine should be given, and this seems to have a more "solid" effect on the heart itself than the adrenaline, which would appear to act especially on the blood pressure. I have had no experience of Barker's stovaine-glucose solution.

Technique.

The whole back from the mid-dorsal spines to the sacrum is painted with iodine, and the injection made with the patient sitting on the edge of the table, the head well down on the chest, the elbows resting on the inner sides of the thighs and the back strongly arched. The injection may be made in any of the spaces from that below the last dorsal vertebra downwards, and the only certain proof of proper entry into the cerebro-spinal space is the flow of clear fluid, which may only run in drops or in a full steady stream. I make the puncture exactly in the middle line and use an ordinary exploring needle without a stilette, and fit it on to an ordinary all-glass (5 c.cm.) syringe. If I feel sure that the needle is properly placed, and still no fluid flows, I then introduce a stilette to clear the point of the needle, if twisting the needle round does not succeed in promoting a flow. It is better to remove the needle altogether or try a higher space than to persist in searching for the right track with the point still buried after two or three failures in different directions. When the flow is satisfactory, the syringe, already charged with the stovaine solution and cleared of air, is fitted on. The cerebro-spinal fluid then flows in by its own pressure, and dilutes the solution by half or even more. This mixture is then slowly injected, and an attempt made to draw back into the syringe another quantity from within the theca. This is again slowly injected, and then the needle with the syringe still attached is slowly withdrawn, and the patient at once placed in the semi-recumbent position, with his head, back, and shoulders well raised on pillows. If the cerebro-spinal pressure is not sufficient to force the fluid into the syringe, it may be assisted by drawing out the piston and exercising suction. It is well, I think, to dilute the stovaine solution with cerebro-spinal fluid before injecting whenever possible, though I must admit that in several cases, in operations in which a large dose of stovaine is not necessary, anaesthesia follows when no mixture has been effected. Further, I must confess that in old men, in whom I was certain that the needle was properly placed but no fluid came out, I have injected stovaine with perfectly successful anaesthesia. But this practice is to be deprecated, as failure is almost certain to occur.

Failure to enter the canal may occur in old men who cannot bend their backs properly, and in whom there may be some bone condition, such as osteo-arthritis, which occludes the already small intervertebral spaces.

In certain cases the injection is given with the patient curled up on his side, and is even easier than in the sitting position. A few drops of fluid very often escape from the puncture, but no dressing is required.

Effects of the Injection.

In most cases, beyond the pain of the prick of the needle in the skin, nothing is felt of the actual puncture; but almost at once tingling and formication commence in one or both legs, followed by a feeling of dead weight, and within a few minutes of the injection sensation is entirely lost or considerably blunted. Rarely a sharp shooting pain runs down one leg immediately on insertion of the needle, presumably from the pricking of a bundle of nerves in the cauda equina.

If the anaesthesia is going to succeed, the operation may be started as soon as the necessary preliminaries are over.

In the majority of cases anaesthesia is absolute and the operation can be completed without any difficulty, the effect, with a full dose of stovaine, beginning to wear off in about an hour. It may last longer, and I have had a case that remained anaesthetic during an operation that lasted 1 hour 40 minutes. As soon as the effect begins to wear off it is better to give a little chloroform—and it really is only a little that is usually required—instead of a second injection, to complete the operation.

The degree of anaesthesia varies considerably. Some fail absolutely (see Mr. Richards's paper). In cases not entirely successful the first incision through the skin is sometimes quite painful, but the subsequent steps of the operation are quite painless. As already mentioned, in operations for hernia the necessary pulling on the peritoneum before ligature above the neck of the sac is often felt, and the handling of the testicle in hydrocele may also give pain. Again, more particularly in hernia operations, it is not infrequently remarked that the suture of the muscle is more liable to be felt than the ligaturing or suturing of any other tissue in the course of the operation.

The anaesthesia usually extends up to the costal margins, thus permitting of operations on liver abscess, if a rib not higher than the eighth is excised, and also on hernias of the linea alba, just below the ensiform cartilage. Abdominal operations, provided they do not involve any handling of the under surface of the diaphragm, can nearly all be done with ease, and the relaxation of the muscles of the abdominal wall is particularly convenient. In cases of acute abdomen, however, I am not at all convinced that stovaine is better than, or as good as, scopolamine and chloroform. With all due deference, I submit that in quite a fair proportion of cases there is shock evidenced by pallor, faintness, nausea, and feeble pulse, in varying degrees, after stovaine injections; and though in our Egyptian experience acute abdomens, almost without exception, reach us in a very hopeless condition, and the selection of an anaesthetic scarcely influences the inevitable fatal issue, as a matter of experience I do not recommend stovaine in such cases. And yet in other situations associated with severe shock—as Mr. Thom has pointed out—good effects have been noted, some of which may, however, be due to the relief from pain afforded by the stovaine injection.

In operations on the perineum, particularly haemorrhoids, fistulae, both urinary and rectal, and perineal operations for stone or bladder conditions, a smaller quantity of stovaine is required to produce anaesthesia than in any other situation. Lithotrity, suprapubic cystotomy, hernia, and hydrocele require proportionately larger doses, but amputations, excisions, and bone operations on the lower extremities may be performed with quite moderate doses.

The patients usually declare that below the level of the anaesthesia the parts are as if dead, yet occasionally some are quite conscious of the handling of the area of operation, but experience no pain at all. In such cases, too, the application of a hot lotion is sometimes quite severely felt.

The General Condition of the Patient during Operation.

Most cases lie perfectly still and placid, and are not upset in any way. Others feel faint or giddy, become very pale and have urgent nausea. If they are sick they are much better at once; but if not, their pallor increases, they have repeated retching, and bring up some mucus, and may have all the usual symptoms of a mild collapse or even definite heart failure. A drink of water may recover them at once, or, if this is without effect, a dose of brandy is a most potent and rapid remedy. It is best, however, when these milder measures are not effective, to give 5 minims of a 1 in 1,000 adrenaline chloride solution, followed, if necessary, by strychnine. The milder cases usually react very quickly, but if not, and there are signs of a failing pulse and gasping for breath, more active measures, and particularly intravenous saline injections, must be resorted to and continued till a definite improvement takes place. In cases of high anaesthesia this "air hunger," associated with extreme pallor, is only too common and to an alarming degree, and on this account this form of stovaine anaesthesia should not be used.

I have had two cases, both in private practice, in which symptoms of complete heart failure came on almost immediately after the injection; and it was only by dint of repeated injections of adrenaline, strychnine, caffeine, and sparteine, with artificial respiration, that I was able to save them and complete the operation. One case was an old full-blooded Turk, with advanced arterio-sclerosis, with an impacted stone in the urethra, who, after his narrow escape, surprised us all by taking French leave and walking out of hospital four hours afterwards. He came back two days later none the worse for his adventure. The second case was an alcoholic subject on whom I was operating for fistula in ano, and, though he had very alarming symptoms for a short time, he very rapidly recovered and had no further trouble.

Another accident happened with an old Egyptian army officer who was very ill with diabetes and a large gangrenous cellulitis all round the anus and ischio-rectal fossa. The operation was almost finished when he collapsed, and it took us all our time to bring him round. We eventually succeeded, and he went on well for nearly a fortnight, when he developed diabetic coma and died. The bad symptoms were, I think, due here to rough handling of the patient, a very heavy man, when lifting him from the lithotomy position back to a recumbent position in bed.

Fatal Cases in this Series.

Dr. Hassan Shaheen, anaesthetist to the hospital, has kindly given me the following notes of three fatal cases that have occurred in my section. Of the first two I cannot speak, as I was not present at the operation, but the third would certainly have been best operated on under chloroform, though he had taken stovaine well at his first operation.

CASE I.—A little boy of 13 was admitted on April 4th, 1911, for ruptured urethra, with considerable extravasation of urine and blood. An injection of 0.04 of stovaine adrenalin was given in the second lumbar space. The patient was rather collapsed, and his condition was unsatisfactory from the beginning. A Cock's puncture was made and the bladder washed out. About five minutes after the injection the boy complained of discomfort in breathing, and his pulse became weak, and, though he improved after brandy, the pulse soon failed again, and in spite of everything he died of heart failure, verified also by the *post-mortem* examination.

The dose may have been too large and the injection too high, but, whatever happened, I am afraid we must consider this fatality as certainly directly due to the anaesthetic.

CASE II was a very feeble patient, admitted for anaemia, ankylostomiasis, and liver abscess. He was very emaciated, with a high pulse rate, 102, and complained of pain in the jaws and pharynx, with difficulty in swallowing. The heart sounds were hardly audible, and he was suffering from diarrhoea. He was operated on on July 14th, 1911. There was oedema behind as high as the third dorsal vertebra. The injection was made in the eleventh dorsal space. Breathing was stopped as soon as the rib was being cut, and then the pulse also. No treatment was of any avail.

Post mortem the heart was found very soft and flabby, and the right side dilated and filled with mixed blood clot. The lungs were very bloodless, and had some oedema at their bases. The liver and kidneys were extremely fatty, the spleen enlarged and cirrhosed, and there were many ankylostoma worms in the mucous membrane of the intestines.

This operation, which was one of urgency, would have been best done under a local anaesthetic, as the patient was in an extremely weak state. I do not think stovaine can be blamed for this fatality; it would probably have occurred with any general anaesthetic.

CASE III.—This man was admitted on November 19th, 1911, and operated on for an abdominal tumour, which turned out to be a twisting of the kidney, in such a way that the ureter lay right across the front of the organ. The ureter was replaced and the appendix also removed. On this occasion he took stovaine quite well. Ten days after the operation he developed a septic temperature, and it was obvious a few days later that the kidney was intensely inflamed; indeed, we found at the operation it had become gangrenous. Eighteen days after the first operation 0.06 stovaine adrenaline was injected into the first lumbar space and the kidney removed, and a large perinephritic abscess evacuated. Just before the completion of the operation the patient suddenly collapsed and died, though everything possible was done, including even massage of the heart through the abdominal incision.

At the necropsy the heart was in a state of fatty degeneration, with a widely dilated right side, full of fluid blood, and the left kidney contained several pyaemic abscesses.

In the first place the kidney should have been removed at the first operation, and no second operation would have

been necessary. Then by an error of judgement we gave him stovaine in the very case where it is not wise to give it, a patient weak from a continued septic fever and pyaemia, and death was entirely due to a sudden collapse, perhaps stovaine-induced, acting on a fatty septic heart. We have had no further fatalities.

The After-effects of Stovaine Anaesthesia.

After a variable time, generally within an hour or two at most, movements of the legs may be made and sensation returns. Pain in the legs is often complained of, and later headache and backache. The legs may sometimes give more trouble than anything else, but usually recover within two days. I have never seen any serious effects from stovaine, though fever, headache, giddiness, backache and retention of urine may persist for some days. Once the dangers at the time of the actual injection itself are over no further trouble is likely to occur.

THE CASE FOR AND AGAINST STOVAINE ANAESTHESIA.

In considering the case for stovaine one is naturally bound to compare it for efficiency and safety with chloroform anaesthesia, and in general terms I think we must look on stovaine as a valuable alternative to (ether or) chloroform in operations on certain definite areas, but as never destined to replace them. It is true that the accidents of stovaine are generally more alarming than dangerous, but when they *do* occur there is a dreadful feeling of helplessness, which is particularly perturbing. We have certain danger signals with chloroform which are well recognized and can be immediately replied to, and moreover the administration of the anaesthetic can be immediately discontinued; whereas in stovaine the danger gives very little warning, if any, and the damage is done and cannot be undone, as, though it is recommended, the withdrawal of a quantity of cerebro-spinal fluid in such an emergency is hardly practicable. It is true that only a very small proportion of cases give rise to the least anxiety, but a method must be judged by its possibilities of danger when the question of a human life is concerned. Profound lowering of blood pressure, heart failure, and "air hunger" are the more serious possibilities to be faced, and these can only be avoided by careful selection of cases, the proper grading of doses to suit individual patients and conditions, and the most careful adoption and retention of appropriate positions, to prevent the dissemination of the drug beyond the limits of safety within the spinal canal.

With increased experience naturally there is a greater certainty and security about our results, but we have not yet that perfect trust and confidence we should have in our anaesthetic in the case of spinal anaesthesia with stovaine (in the solutions we have been accustomed to employ).

Briefly, we have, then, in stovaine a reliable anaesthetic for all operations below the costal margins, but one must not expect too much of it, or employ it without careful consideration, especially in cases where any form of general anaesthetic would be dangerous. Moreover, the fallacy that after the injection is given and anaesthesia established it is no longer necessary to trouble about the patient, must be once and for all dismissed. Just as much care must be exercised in the administration of the drug and in the management of the patient after injection as with chloroform, and when this is done the feeling of satisfaction, after an extensive operation under this form of anaesthesia, when the stovaine has acted perfectly and the after-effects have been almost *nil*, must be experienced to be thoroughly appreciated.

If a somewhat pessimistic note has unconsciously crept into these observations, I am, on the whole, content to leave it so, as a well-intentioned protest against the impression that stovaine is entirely devoid of all danger, and that at worst its only drawback is failure, partial or complete, to produce the requisite degree of anaesthesia.

THE Royal Sanitary Institute has established an examination for smoke inspectors. The first examinations will be held in Manchester in April, and in London in May next. The syllabus can be obtained from the Secretary of the Institute, 90, Buckingham Palace Road, S.W.

COMPLICATIONS FOLLOWING THE ADMINISTRATION OF HEDONAL.

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THE discovery of an ideal anaesthetic with ideal methods of administration is a problem amongst the most important that the medical profession has to solve. Even under the most favourable circumstances fatalities from time to time occur on the operating table, whilst post-operative complications on very many occasions are such as seriously to retard the progress of the patient towards recovery, even if life itself be not sacrificed to such a sequela as pneumonia. Indeed, surgical interference is often reluctantly postponed or abandoned on the ground that the risks of anaesthesia are too great. The recent more extended use of the intravenous infusion of hedonal has roused hopes that an anaesthetic has been found which gives a satisfactory anaesthesia, and at the same time is comparatively free from post-operative complications.

Hedonal has now been administered over 300 times in the Leeds General Infirmary in a great variety of cases, and though it is early yet to speak with authority, the number of complications following the administration of the drug is such as to warrant a record of them, in the hope that means in the future may be found to guard against their occurrence.

I have classified the complications as follows:

1. *Cutaneous.*

(*a*) *Local Oedema.*—The commonest situations for this are the lumbar and gluteal regions. The manifestations vary from a redness of the skin with slight infiltration to a tender brawny oedematous swelling, pitting on pressure. After a variable time the oedema disappears, occasionally leaving a mark as of a severe bruise. In one case this "bruising" extended across the small of the back, and measured, roughly, 12 in. by 4 in. Unless the greatest care were taken, bedsores would readily develop.

(*b*) *Blisters.*—These are most commonly found on the heels or outer side of the foot, but they have also occurred on the chest, abdomen, inner side of the thigh, and elsewhere. They resemble closely in appearance the blister raised by the accidental contact of an unprotected hot-water bottle. As regards the explanation of these phenomena, it is to be remembered that hedonal produces an unusually long anaesthesia. Patients, therefore, are apt to remain in one position too long, and local pressure effects are thereby produced. In some of the cases this was undoubtedly so, but now the nurses are on their guard against this complication and every precaution is taken. In spite of this, however, some examples still occur. The blisters have appeared within an hour or two after operation, and on one occasion before the patient left the theatre. They have appeared in the weakly and robust patient alike. They have occurred more frequently in those cases where there has been a large amount of fluid injected. There seems to be a lowering of the powers of resistance in the tissues and trauma or pressure, even slight and temporary, is the deciding factor. In one case—an operation on the jaw—in which a blister appeared on the chest, it is probable that the pressure of the surgeon's or assistant's elbow was sufficient. In all the cases there is a close analogy with those nervous diseases in which even the most trivial pressure can rapidly produce most alarming results.

2. *Pulmonary.*

(*a*) *Oedema.*—The mere injection of fluid of itself may produce oedema of the lungs, and clearly this liability bears a direct relation to the amount of fluid injected. I have had the opportunity of examining the lungs of a patient who died a few hours after operation where this method of anaesthesia had been used, and the death was attributed to exhaustion. The case was one of impaction of the after-coming head, and before admission to hospital the patient had been subjected to very severe handling. *Post mortem* the lungs were found to be highly oedematous, whilst there was no other abnormality detected in the rest of the viscera by the naked eye or by the microscope. This oedema doubtless occurs in many cases, and

passes off without giving rise to symptoms. It may, however, be attended with real danger, as the following case shows, for the notes of which I am indebted to the House-Surgeon, Mr. Tatlow:

V. S., aged 19; 1,350 c.cm. of 0.75 per cent. solution injected. The patient was operated upon in the morning for inguinal hernia, the administration of the anaesthetic ceasing at about 10 a.m. On his return to the ward from the theatre it was noticed by the nurse in charge that the patient seemed very "chesty." Between noon and 1 p.m. the patient was pale and the extremities cold. At 3 p.m. the temperature was 100.2°, the pulse 120, and the respirations 35. At 5 p.m. the breathing became more laboured, and the patient was distinctly cyanosed. The throat was full of frothy blood-stained mucus, and was swabbed out. Vomiting was induced by mechanical means, and $\frac{1}{100}$ grain of atropine sulphate injected. The patient soon became relieved; consciousness returned at about 9 p.m., and next morning he was practically free from symptoms. The subsequent progress of the case was uneventful.

(*b*) *Pneumonia.*—In preanaesthetic days pneumonia was a well-recognized complication of surgical injuries and operations. With inhalation anaesthesia the risk is considerable, especially after the administration of ether. In my series of cases after the injection of hedonal there have been several in which there has been slight bronchitis for a day or two, and others where a severe attack of pneumonia has followed. There have been three fatal results from this complication.

T. W., aged 20. The patient was a well-built young man accustomed to active out-of-door life. Operation on May 9th for recurrent appendicitis; 1,400 c.cm. of 0.75 per cent. solution used. Almost immediately on his return from the theatre the breathing became embarrassed. The pulse was poor and frequent and there was some cyanosis. The patient came round about twelve hours after operation and soon began to complain of pain in his chest. The temperature was raised, the respirations were 40 per minute, and the pulse continued frequent. For a few days the symptoms persisted with little or no abatement. On May 15th the patient began to expectorate with difficulty. The next day the sputum became offensive, and on May 17th I was asked by Sir Berkeley Moynihan to see the case. The patient was extremely ill and presented the anxious cyanosed aspect of a sufferer from pneumonia. On examination a pleural friction rub was detected over the greater part of the left chest, whilst there was dullness at the base behind on the same side with tubular breathing. There were also signs of a commencing bronchopneumonia in the right lung. During the next few days there was some improvement in the patient's condition and the sputum became less offensive, though the temperature, respirations, and pulse-rate still continued high. At the end of a week the patient again became gravely ill. Physical examination at this time showed that the lower lobe of the right lung was extensively involved. The sputum again became extremely offensive and there was a brisk haemoptysis. For several days the condition of the patient caused considerable anxiety, but subsequently he began to improve, and finally became convalescent. He is now quite well.

A. T., aged 31. Cholecystotomy and choledochotomy; 1,300 c.cm. injected; 3 gr. of hedonal were given two hours before operation. As in the previous case, pulmonary symptoms soon developed, and death ensued on the twelfth day. *Post mortem*: Site of operation healthy. The lungs were in an advanced state of confluent bronchopneumonia and honeycombed with small abscesses. No other noteworthy abnormality was found.

(*c*) *Infarction.*—I have not personally seen this complication, but I have had information of an undoubted case where the embolus was considered to have originated from a thrombus in the vein which was used for the purpose of injection. The complication occurred fourteen days after operation. The patient made a good recovery.

3. *Venous.*

(*a*) *Thrombosis at the Site of Injection.* — In the majority of the cases there has been thrombosis in the vein selected for the infusion, usually the median basilic or median cephalic. In many instances this has been shown by a linear staining of the skin along the course of the vein, which could itself be felt as a thick fibrous cord. The thrombosis apparently extended as far as the junction of the vein with the axillary. With the exception of the case of pulmonary infarction already referred to, this thrombosis does not appear to have had any untoward result. The risk of suppuration is, of course, with the usual antiseptic precautions, infinitesimal.

(*b*) *Thrombosis of the Femoral Vein.*—This is not infrequently met with as a complication of severe illness, and it sometimes follows surgical operation. Thrombosis of the femoral vein has occurred in five of the cases in my series subsequent to the administration of hedonal. I cannot but think that the proportion is too high to be otherwise than in direct causal relationship to this method of inducing anaesthesia. I quote two examples:

K. D., aged 30. Operation for excision of gastric ulcer; 1,610 c.cm. used. This patient was an unusually long time before coming round. Thrombosis of the left femoral appeared on the fourth day. It should be stated that this patient was very anaemic.

A. E. W., aged 34. Appendicectomy; 1,130 c.cm. injected. Thrombosis appeared on the fourteenth day.

(*c*) *Cerebral Thrombosis.*—In one of the cases of severe bronchopneumonia a right-sided hemiplegia with aphasia appeared on the sixth day. The symptoms, however, were only slight and after a few days gradually passed off.

Summary.

The technique employed in all the cases has been substantially the same as that described by Mr. Page in his paper read before the Royal Society of Medicine. The usual rate of flow is from 80 to 150 c.cm. per minute until anaesthesia is produced, when the fluid is allowed to run in drop by drop. The best results have been obtained where anaesthesia has been induced fairly rapidly, and it is found that in these cases less of the solution is required.

There is no doubt that hedonal is a very pleasant anaesthetic. Patients with whom I have discussed the matter who have had experience of ether or chloroform much prefer the newer method. Indeed, I have heard of one who, on being told that he was to have ether, declined operation and left the hospital. There is an absence of the feeling of suffocation which patients naturally dread so much, whilst vomiting as consciousness returns is only exceptionally present. Hedonal also provides an excellent surgical anaesthesia.

On the other hand, it is clear that the injection of a powerful drug in large quantities of fluid is not without a very considerable element of risk. When 1,100 to 1,200 c.cm. have been administered the danger zone has been reached. Practically no complications have occurred where a lesser amount has been employed. The oedema of the lungs which results from an overdosage renders them especially liable to infection from the micro-organisms which are constantly present in the mouth and which may readily be inhaled during the period of unconsciousness. Especial care should therefore be given to antiseptic treatment of the mouth and teeth before operation, whilst subsequently, if a large amount of fluid has been given, the upright position is to be recommended. On the slightest symptom of pulmonary oedema vigorous measures should be taken to secure the clearing of the air passages.

In cases in which there has been severe shock or much previous loss of blood—in those cases, that is, in which treatment by venous infusion might be considered—this method of anaesthesia is clearly of advantage.

That especial directions should be given to the nurses in charge of patients who have been anaesthetized with hedonal follows from what I have already said.

Finally, I wish to express my thanks to the members of the surgical staff for kindly granting me access to their cases.

CONGENITAL SYPHILITIC DEAFNESS TREATED BY SALVARSAN.

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The following case is, I think, of interest, as this form of deafness usually progresses very rapidly in spite of any form of treatment, and usually when the patient has once become deaf no treatment will produce any improvement at all.

A woman aged 22 presented herself on June 8th, 1911, at my out-patient department at the Seamen's Hospital complaining of deafness of five days' duration. Its onset had been sudden, the patient becoming completely deaf within forty-eight hours of the onset of the symptoms. She was brought to the hospital by her mother as she was unable to hear anything herself. Severe tinnitus was present in both ears, but there was no history of vertigo, sickness, or headache. Both tympanic membranes were slightly indrawn and thickened, but there was no fixation of the malleus or impaired mobility of the membrane. Both the nose and throat were normal and no other intracranial nerves were involved. As the patient was

obviously suffering from eye trouble she was seen by my colleague Mr. Bickerton, who reported that old interstitial keratitis was present in both eyes. Bone conduction to all the tuning-forks from C (128 d.v.) to C^3 (1024 d.v.) on both sides was absent, as also was the hearing by air conduction for all the forks from 3 C 16 to C^4 (2048 d.v.). Hearing for the very loud voice, the whisper and acoumeter were absent. A Wassermann reaction was immediately performed, and gave a positive reaction. On June 12th an intravenous injection of 0.6 gram of salvarsan was administered by Mr. Porter, the resident medical officer at the hospital. On June 15th the tinnitus was better, and the hearing tests gave the following results: On the left side the conversational voice was just heard, as was also the acoumeter, whilst the C tuning-fork (128 d.v.) could just be heard by bone and air conduction. On the right side the acoumeter and voice could just be heard, and the C fork by bone conduction only. She remained in the same condition on the left side for about four weeks, but the hearing for the acoumeter, voice, and the C fork (128 d.v.) by bone conduction on the right side was lost and never returned.

On July 1st the patient received a second intravenous injection of the same amount of salvarsan, and on July 17th the hearing on the left side was found to be the same as on June 15th.

The patient still continued to improve on the left side, and on September 9th the conversational voice could be heard at 3 in., the acoumeter was just heard, and the patient's bone conduction to the C fork (128 d.v.) was only −20 seconds as compared with the normal, whilst by air conduction it was −40 seconds as compared with the normal. The 1 C 64 and the C^1 C^2 and C^3 forks could just be heard by air conduction.

On September 18th she received a third injection of the same amount of salvarsan intravenously, after which she again improved slightly on the left side, and on October 17th the acoumeter was found to be heard at half an inch and the voice at 5 in., whilst the hearing for the C fork (128 d.v.) by air conduction was now found to be −30 seconds as compared with the normal, that is, an improvement of 10 seconds. The bone conduction for this fork, however, remained the same, that is −20 seconds.

The Wassermann reaction still remains positive in spite of the three injections, and my experience is that it always does so, unless mercurial treatment is administered at the same time.

Unfortunately the right ear fell back after the first injection, but the left ear, as shown by the tests, improved markedly.

Since writing the above notes the patient has had a relapse, the hearing in the left ear completely disappearing again, the patient passing into the same state as when first seen. With inunctions of mercury and large doses of potassium iodide internally the hearing has returned in the left ear, which is now in the same condition as when tested on October 17th. This case, with other cases which I have had under my charge, proves without a possibility of doubt that salvarsan by itself will not cure syphilis, but only the local manifestations of the disease.

LOCAL APPLICATION OF SALVARSAN IN CHRONIC SUPERFICIAL GLOSSITIS.

BY

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PROBABLY the most notable and rapid improvement effected by the intravenous injection of salvarsan is seen in severe or in old-standing ulcerations in the mouth. The following case is instructive in showing that the same may possibly be true of the local application of salvarsan to the mouth, and more especially as it is a case in which there was no history of syphilis, and which got worse under the administration of iodides and mercury.

A. W. D., aged 50, with no history or suspicion of syphilis, suffered with a sore tongue, due to excessive smoking, on and off for twenty years. He had been under occasional medical treatment for his tongue for twelve years.

He came to me on February 15th, 1912, with chronic superficial glossitis, the tongue was fissured and was bald of papillae on most of the left side. Just to the left of the middle line of the dorsum there was a raised circular growth ⅜ in. in diameter surrounded by a sulcus. The growth and substance of the tongue round about were hard. The left margin of the tongue was ulcerated, and there was an ulcer on the dorsum the size of a threepenny-bit. The tongue was so sore and painful that the patient had great difficulty in eating. For two years he had not been able to eat any fruit owing to the pain. His dietary was restricted to the blandest of foods, and those he took with discomfort, but he was still continuing to smoke. Since he came to me he has given up tobacco completely.

I painted the growth with cocaine and snipped it off, and received the following report on it from the Laboratories of Pathology and Public Health: "This small nodule shows thickening of the squamous epithelium, and the processes which dip into the underlying tissue are hypertrophied. Some of these processes give rise to some suspicion. Their outline is indefinite, and in one instance at least there is an appearance of the cells having spread out from the base of the process and they appear to be invading the surrounding tissues. The latter are infiltrated with the small round cells. While entertaining grave suspicions of this growth we cannot say there is conclusive evidence of malignancy." A Wassermann reaction was not done on the score of expense.

The patient was put on potassium iodide and liq. hydrarg. perchlor., working up to 12 grains and 1 drachm respectively three times a day. The places were painted judiciously with chromic acid, picric acid, and once with the acid nitrate of mercury, and an alkaline mouth wash was used frequently every day. By the beginning of April the tongue was worse, the ulcers had increased in size, bled readily, and the patient had great difficulty in eating, and was losing weight and becoming anaemic. I then stopped the biniodide of mercury, and gave him a tonic. The pain became somewhat easier, but the central ulcer, where the growth had been removed, began to proliferate, and became again raised above the surface.

I sent him to Guy's Hospital, where he was seen by Sir Alfred Fripp, with a view to removing the diseased area. I had read in McDonagh's book on *Salvarsan in Syphilis* that salvarsan had been used locally in cases of stomatitis, which is usually due to spirochaetes of all sorts, and that another mouth organism, the fusiform bacillus, disappears with salvarsan. I asked Mr. McDonagh's advice as to how to apply salvarsan locally, and he recommended a strong solution in glycerine. With Sir Alfred Fripp's concurrence, I proposed to give the tongue a short trial with local applications of salvarsan before finally deciding to have it operated on. I dissolved 0.1 gram of salvarsan (this is the smallest quantity made up, and costs 2s. a tube) in half a drachm of water, and added half an ounce of glycerine. On May 7th I swabbed the whole tongue with this, and more especially rubbed it into the ulcers. I gave the bottle of solution to the patient, with some cotton-wool, and instructed him to do the same every hour for ten hours, and under no circumstances to use it next day, but to come back for a fresh dose in three days' time. In three days' time the ulcers were 25 per cent. smaller, and the whole tongue was much improved.

The same treatment was renewed on May 10th, 14th, and 21st. A week later, after these four days of painting with salvarsan, and at the end of three weeks from the commencement of the treatment with salvarsan, all the ulcers were completely healed, the fissures had largely disappeared, and the tongue was moderately healthy looking, completely different from its condition three weeks previously. There was, and still is, some hardness to be felt about the site of the original nodule. A few days later the patient had some slight tenderness and smarting along the left margin of the tongue, and there were two small and very shallow ulcers. On June 1st I gave him another dose of salvarsan to paint his tongue with, and on June 4th they had cleared.

This is the only case in which I have had an opportunity of trying the action of salvarsan locally, and I record it so that others may be induced to try it. There is one point on which I would like specific information, and that is as to how long it takes for salvarsan to oxidize into a poisonous salt of arsenic, and whether the amount used in swabbing the tongue would be deleterious to the patient after oxidization had taken place. The amount used in the above case was roughly 1½ grains, dissolved in ½ ounce of glycerine, and of that quantity only about a half was used in hourly swabbings over ten hours. I was nervous of allowing the patient to use the same solution on the following day. He had no symptoms whatever of arsenical poisoning.

The points to emphasize in the case are:

1. The long standing of the glossitis and the rapid proliferation of the ulcer which had been formed by the removal of the nodule.

2. The condition of the tongue became more acute and painful under the administration of iodide and mercury, although the patient had given up all tobacco for over two months.

3. The patient had been under careful medical treatment on and off for seven years before I saw him, and had given up smoking for short periods. He had improved under these treatments temporarily, but his own confident assertion is that his tongue has never been so comfortable or looked so well for ten years as it is at the present time.

4. The extraordinary rapidity of the improvement of the whole tongue. At the end of one week, and after only two days of salvarsan, the ulcers had diminished to one-quarter their size.

There may possibly be a field for similar treatment of chronic inflammations of the nose as well as the mouth, such as old-standing antrum trouble, and it would be useful to hear the opinion of bacteriologists on this subject.

ACUTE FORMALDEHYDE POISONING.

BY

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FORMALIN, a 40 per cent. solution in water of the gas formaldehyde, acts, when taken internally, as an irritant poison, but its toxicity and the symptomatology are still little known. Of the few cases described in the literature, an imbecile, aged 26, died thirty-two hours after swallowing between 1 and 3 oz. (30 to 89 c.cm.) of a 4 per cent. solution of formaldehyde.[1] Gerlach's patient,[2] a girl, aged 21, survived a dose of 2 to 2½ oz. (60 to 70 c.cm.) of 35 per cent. formaldehyde; and Zorn's case,[3] a man of 44 years, about ½ oz. (15 c.cm.) of a 35 to 40 per cent. solution. Klüber[4] described the symptoms of a man who drank an unknown quantity of formalin and recovered. These last two cases were referred to pretty fully in the BRITISH MEDICAL JOURNAL, 1901, vol. i, EPITOME, Nos. 42 and 300. Levison[5] had a fatal case of a man, aged 60, who lived only twenty minutes after swallowing an unknown quantity (estimated at 2 to 3 oz.) of commercial formalin.

The case now recorded is as follows:

A married man, a brushmaker, aged 63 years, who had been a heavy drinker for about forty years, was off work and drinking on April 15th and 16th, 1912, and left home about 8 a.m. on April 17th without taking any breakfast. He was seen, about 9.15 a.m., when near a well in a public park, to become rapidly ill. He staggered, doubled up over a low railing, and retched viscid mucoid material. He was put on a seat and grew rapidly unconscious, with body stretched out and head bent back over the seat. It is not certain from the description if this was or was not opisthotonus, a condition induced in animals by injection of formalin. The man was supposed by bystanders to be in a "fit," and was laid out on the grass with collar loosened. He was breathing "heavily," with chest heaving and eyes rolling, and was perspiring moderately. Accounts differ about pallor or flushing of the face. No convulsions or twitchings of muscles were noticed, nor was any attention drawn to coldness of hands and face. After being unconscious for about fifteen minutes he gradually became conscious, and when seen by a policeman at 10 a.m. refused to give his name, saying nothing was the matter with him, and denying having drunk from a bottle seen in his pocket. The policeman, after smelling the contents of the bottle, at first had the impression that he could detect the same odour in the man's breath. The man did not again vomit, but was now suffering very severe abdominal pain, causing him at intervals to double up almost on his hands and knees. There was some froth about his mouth, but no discoloration of the lips or mouth was noted. He staggered along with assistance for about 100 yards, then fell to the ground writhing with pain, and relapsed into unconsciousness, from which he did not again emerge.

At 11 a.m. he was admitted to hospital, unconscious, intensely collapsed and almost pulseless. His skin was pale, cold, and clammy. The mouth was opened with a gag, but showed no discoloration, and did not smell of formalin. All reflexes were absent on admission, except the corneal reflex, which was lost also in a few minutes, and respiration stopped. The stomach was washed out, stimulants given, and artificial respiration applied, but death occurred at 11.53 a.m.

On the man's person were found a written message clearly pointing to suicide, and a 6-oz. bottle containing 3¼ oz. (108 c.cm.) of formalin, found by analysis by the iodine method to contain 34 per cent. of formaldehyde as well as a little deposit of paraformaldehyde. This was proved to have been given by the Sanitary Department to the man's wife for disinfecting purposes four years previously. She then used at least half the quantity of formalin missing from the bottle. She has the impression that she used about three-quarters, but is not so certain of this. It is unfortunate that the police authorities did not order a *post-mortem* examination, but the information as above given was collected from reliable witnesses.

There can be no doubt that death was in this case due to swallowing a quantity, not exceeding 1 oz., of commercial formalin. The man, though thin, undersized, and probably of low vitality from alcoholism, was not known by his family or medical attendant to suffer from any organic disease. He had never had any kind of "shock," and there is no history of epilepsy in the family.

In the cases described there seems to have been considerable variation in the symptoms, due probably in part to the dosage. Here the points of interest are the tendency to vertigo, the unconsciousness, and the greater implication of the respiratory than the circulatory system, all of which occur in most of the cases quoted. The predominance of cerebral symptoms, leading to early death, gave little opportunity for the development of signs of irritation of the kidneys and the alimentary canal, apart from the intense pain in the latter and the initial vomiting. This case confirms the deduction to be drawn from the others that formaldehyde is really a potent poison, probably differing little in degree of toxicity from carbolic acid.

REFERENCES.

[1] Bock, *Indiana Med. Journ.*, 1899, vol. xviii, p. 122. [2] Gerlach, *Muench. med. Woch.*, 1902, p. 1503. [3] Zorn, ibid., 1900, p. 1588. [4] Klüber, ibid., 1900, vol. xlvii, p. 1416. [5] Levison, *Journ. Amer. Med. Assoc.*, Chicago, 1904, xlii, p. 1492.

A SCHEME FOR MEDICAL BENEFIT.*

BY

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BECAUSE we are unanimous in the statement of the conditions we require if we are to work in the Government way, it does not of necessity follow that we think the Government way is the most business-like, efficient, or economical that could be adopted. All we say is that, given the form, we must have certain essential conditions.

The normal form of medical benefit that the framers of the Act undoubtedly contemplate is, of course, contract or club practice. This is the very system that for twenty years and more doctors have been kicking at, and although, granted adequate safeguards and pay, it can be both efficiently and profitably carried out, yet few will be bold enough to say that it constitutes, even under the best auspices, an ideal relation between patient and doctor.

Again, speaking broadly, the Act gives medical benefit to insured persons only, and uninsured women and children have no share. Inasmuch, however, as this measure is "an Act for the prevention and cure of sickness," it is perfectly clear to medical men, and indeed to any one whose mind is informed by biological knowledge, that the best way to attain the object thus indicated in the title of the Act is to make provision first and foremost for the medical care of women and children.

Here, then, are two shortcomings—I should rather say capital errors—of the Act the adoption of contract practice and the exclusion from medical benefit of uninsured women and of children.

The British Medical Association report on club practice a few years ago, and the Majority and Minority Reports of the Poor Law Commissioners all took for granted the inclusion of the dependants, the women and children, in the medical benefits provided by the legislation for which these documents were supposed to pave the way. It is strange that this very proper assumption should have been falsified.

But, it may be asked, very pertinently, suppose women and children are included, how is it possible to provide medical care for all this enormous mass of population? Where is the money to come from? How could it all be done?

Considerations such as these appear to checkmate any attempt at more elaborate and more expensive medical provision. Let us, therefore, survey the board, and see if by some adjustment we cannot achieve victory in the face of defeat.

First, let us consider how doctoring is actually provided for the women and children. They have taken singularly little part in the friendly society movement. Provident dispensaries have certainly made a provision for medical attendance on women and children; but the areas of their success are very local and patchy, and do not extend. Public medical services have made, so far, no very deep or widespread impression on the problem. The National Deposit Friendly Society has the great advantage of offering to any doctor whom the patient may select a payment for work done. Part of the fee is paid from the patient's own deposit and part from the pool to which he

* This paper was prepared for the Section of Medical Sociology of the Annual Meeting at Liverpool, but the author was prevented from reading it by the prolongation of the Representative Meeting, of which he was a member.

also contributes. But when his deposit is exhausted he is out of benefit. So that the scheme is not really an insurance.

All these and many more agencies form a network throughout the country, but a network with such a large mesh that the bulk of the women and children escape it.

There remain the hospitals and private practice.

The hospitals are based on the mediaeval idea of charity—all giving for the sake of the good work, and no payment except voluntary gifts in gratitude, and those to the institutions, not the doctors. The hospitals have fulfilled a function which the world can only wonder at and admire, and I think that the average layman can only faintly understand the self-sacrifice still willingly given—and not all for the sake of advertisement—to these ancient institutions. They are so essential still to the nation that the hand of legislation—though it has to some extent, perhaps, undermined their stability—yet dare not touch their fabric.

But the hospitals do not undertake the work of domiciliary treatment.

Private practice remains. There is no relation between doctor and patient which, on the whole, is so mutually satisfactory as that in private practice. There is complete free choice of doctor, and the power of changing medical adviser is only restrained by good feeling and commonsense. Amongst the less well-off classes the chief difficulties are financial.

Now, having reviewed the board, what move can we make which, by effecting a combination of pieces, will retrieve the position?

I think that the grand aim we should set before us is to preserve the essential features of private practice. I venture to think that the whole profession would be well advised to unite in maintaining that relation, not only in the case of women and children, to which I have just been especially referring, but also in that of men.

I would respectfully invite attention to a simple and easily understood scheme which, to all appearance, combines the apparently conflicting requirements of private practice and insured medical benefit.

First, there should be free choice of doctor from the *Medical Register*, subject to the consent of the doctor in each case. Then, as in the National Deposit Friendly Society, there should be payment for work done, on a standard tariff. Contract terms imply the underwriting of the health of the nation by individuals. Medical attendance on these terms must often be either ruinous or rotten.

In regard to the accounts, forms, similar to the fortnightly returns of Poor Law medical officers, should be used. The squares opposite the names could be filled up in a few minutes from day to day. The letter "H" by the convention adopted, indicates a visit to the patient's house; "S" that the patient was seen at the surgery. The extras would also have to be recorded, and the completed form sent at the end of the fortnight to the proper authority. As every entry on the form would have a fixed value, according to the tariff, no further book-keeping would be required.

The Authority,* who would thus be able to record the sums due to the doctors every fortnight, would pay the accounts quarterly. The labour of sending out bills, the worry and expense which often attends their collection, the collector's salaries or percentages, the court fees, and the bad debts, would thus all become things of the past.

Now as to finance from the insured person's point of view. First, I suggest that the money allocated to him in respect of medical benefit under the Act should be pooled, and the pool held by the Authority as a fund for use, as I shall explain.

Next I suggest that the insured person himself be liable to the Authority for the cost of the medical benefit he and his dependants receive, up to a maximum limit per annum, and that this limit should be fixed in relation to his average weekly wage. The financial stability of the scheme depends on correctly fixing that proportion. Only experience in working would determine what it should be. Probably it would be best to begin with a rather high figure and give a rebate, if necessary, of 50 per cent., to those who come too near the poverty line. For instance, subject to that concession, it might be well to fix a man's maximum liability for himself and his family at two weeks' wages in any one year. Beyond this the pooled fund would take on the liability.

Let us see how this would work out in a given case. Take the instance of a man supporting a wife and several children, and let us suppose that he is earning £1 a week. Let us assume further that at present he is in a club, for which he pays a sum which works out at 5d. a week, and that for this he gets, amongst other and more costly benefits, the right to the services of the club doctor for his own illnesses. And suppose, further, that he employed the same, or some other, doctor as the private medical attendant of his wife and family. How would his position compare, under the scheme which I have suggested, with his present one?

In the first place he would lose his right to free medical attendance for himself personally, and he and the members of his family would all be on the same footing. But, to set against this loss, he would gain the limitation of his liability in respect of his family. Whereas in a given year his doctor's bill for his wife and family might at present easily rise to such a sum as £5, under the scheme being considered he would at most be liable for £2. However many or long were the illnesses of himself and his family during the year, the cost beyond that figure would fall on the insurance funds. Supposing, further, that an illness were a long and tedious one, for which his power of paying adequately would, under the present régime, be soon exhausted, under the proposed scheme he would know that the doctor, in continuing to attend, was not doing so out of mere charity, but that he was being paid for everything he was doing on a business footing.

Now, how is the Authority to recover this liability? I suggest it should do so by requiring or inviting the insured person, on effecting insurance, to create a reserve or savings bank fund, earmarked for himself alone, and equal in amount to his maximum liability; and that it should retain itself the right to draw on this reserve in case of the insured or his family receiving medical benefit. Thus the payments required under the Insurance Act and those required by this deposit would replace those he made to his club and to his family doctor under former circumstances.

The reserve could be created by paying the sum down, or by a system of deferred pay, which could be worked by the co-operation of large employers of labour in the case of their employees, or by weekly instalments. I suggest such instalments as would complete the deposit of the reserve in one year, that is to say, weekly instalments of one fifty-second part of the total. In view of the security offered by payment in advance, I think you can afford to give a rebate of one-tenth of the total.

Thus, still considering the case of the working man with £1 a week, his liability would be £2, less one-tenth, that is to say, £1 16s. On effecting insurance he would, in addition to 4d. under the Act, have to pay each week towards his deposit one-fifty-second part of £1 16s., that is to say, 8d. roughly, or shilling in all. Therefore we have arrived at this, that instead of 5d. a week to the club and an unlimited family doctor's bill, he would under this scheme pay 1s. a week during the first year. After that year, supposing there had been no illness, he would revert to the 4d. After illness had exhausted the deposit, he would, if and when at work, be obliged to bring the deposit up to its full figure by again paying the full 1s. a week.

Many families show from time to time, for a lustrum or even a decade, a clean bill of health. During such periods the deposit would grow by the interest it produced in the hands of the Authority, and would afford a provision for the illnesses of later years.

Further, I wish here to recall a suggestion made by Mr. Lloyd George, that members of solvent friendly societies

* *The Authority*: I mean the Board that manages the business, as distinct from the professional part of the scheme. In the present state of affairs we do not know what this will be, so I use a general term. It may be medical or lay, or a combination. I favour the last, with the lay element predominating—on the analogy of a Hospital Board of Governors. It is not undignified to work with a lay board there; why should it be in a wider or national system? The Insurance Committee—like the County Association in military matters—seems a reasonable authority so far as its general status is concerned; but it should have no more to do with actual medical work and control than the County Association has to do with the officers of the army and the discipline of regiments—that is, *nil*. A business body to manage business matters, and a profession to manage its own professional matters, is the ideal to be kept in mind.

should use certain moneys released from their funds by the operation of the Act, towards providing medical benefit for women and children. The capital value of the amount so released is £5 per head. I would endorse that suggestion, and place the interest of that sum each year, automatically, whether there were illness or not, to the member's deposit account.

The deposit account should be the property of the member, held in trust by the Authority. If unexpended it should be returnable to his family at his death, or to the member himself if he left the country.

The broad principle of this scheme would, I think, result in the best features of private and family medical practice being preserved, whilst the irritating features, so far as they are financial, would be largely avoided. Doctors would be paid on a business footing, yet no patient would be liable for more than a moderate fraction of a week's wages at any one time. Therefore there would be no serious reason or excuse for not coming for medical assistance early in illness. A patient now frequently says, "I did not want to start doctoring because I was afraid of a big bill." That fear would be banished under this scheme. There would be deterrent enough to prevent vexatious claims, time-wasters of doctors, and malingering, that canker of friendly society funds; but it would be light enough to be no bar to early betakement to a doctor by women and children, as well as the employed person of whom the Act makes so much.

Further, the apportionment of payment for attendance on insured persons who constantly change their abode, which constitutes a very serious difficulty under the scheme assumed by the Act—namely, capitation—becomes a perfectly simple matter if each doctor is to be paid just what he does according to the tariff. A gipsy or a canal man will be as easy to provide for as the village blacksmith.

The cost of the greater part of the long and serious illnesses would fall on the insurance funds; that of short and trivial illnesses would be borne by the insured themselves.

Excessive attendance by a doctor would not be encouraged or accepted by the patient. Such, I apprehend, are some of the advantages.

Of course, I assume a £2 wage limit. That is necessary to bring the scheme into accordance with the policy of the British Medical Association; but really I cannot see why, were the whole tariff fixed proportionately, a higher wage limit should present any difficulty.

The difficulties are of diverse character, but I group them together chiefly because it seems possible that the solution of them all is to be sought in the same direction.

Difficulties of the Scheme.

(*a*) Malingering
(*b*) Excessive attendance
(*c*) Excessive demands for attendance
} After the deposit has been exhausted.
(*d*) Provision for consultations.
(*e*) Provision for special forms of treatment.
(*f*) Inspection, necessary under any insurance scheme.

I make the following proposal for dealing with all these with the utmost diffidence. It is merely tentative, and does not necessarily bear an integral relation to the foregoing portions of the scheme.

The proposal involves the formation in each insurance area of a district medical staff, to consist of a body of consultants similar to the staff of a large general hospital. It would be, so to speak, "a hospital without walls," its sphere of work the patients who were referred to it by the doctors practising in the insurance area.

A practitioner would request a consultation with a member of the staff because he desired his assistance or advice in a difficult case, or if the patient was malingering.

Again, it might be the patient who desired a second opinion, and the ready means of obtaining a highly skilled and indubitably authoritative one which the district medical staff would supply, would obviate many of those cases in which one doctor is asked to supersede another at the present time on totally inadequate grounds.

Also, if the Authority suspected a doctor of over-attending a patient whose account had come on to the pool it might request a consultation. The illness would in that case be a long one, and the consultation would have a medical, as well as a disciplinary, value. The subject is unpleasant, but it has to be faced, as the advocates of payment for work done have been taunted with the difficulty it refers to. May I here say, shortly, that the mere fact of the existence of a system of disciplinary consultations would check the need for their use.

I had hoped to bring into this paper some mention of provision for the higher and special departments of medical work; to suggest that, for instance, a skilled ophthalmic surgeon, as a member of the district medical staff, might hold an eye clinic in a convenient centre, such as a market town, once a week—say, on market day; that his clinical assistants should be two or three general practitioners from the neighbourhood, adequately paid for their afternoon's work; that the interest and efficiency which constant association in work with a colleague of undoubted distinction would bring into their professional lives would be reflected in the rest of their practice; that such arrangements might be developed in other departments of medical work; and that the expert work of school clinics would be more economically and better carried out by such arrangements.

But time does not permit. Still, let me say this, that any scheme requires the creation of a vast mass of machinery, both administrative and clinical, and it is surely in the interests of national economy that this machinery should not pick out merely the insured members of households, but that it should include the women and children. Only so can you begin at the beginning to secure the objects avowed in the title of the Act, "the prevention and cure of sickness."

THE REFORM OF HOSPITAL OUT-PATIENT DEPARTMENTS.*

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I HAD the privilege of working some eighteen months ago with a committee appointed by the combined Liverpool and Birkenhead Divisions whose duty it was to draw up a report on the working of the out-patient departments, with special reference to the Liverpool medical charities. It is therefore with pleasure that I incorporate in my paper the conclusions arrived at by that committee.

The Majority Report of the Royal Commission on Poor Law states that: The benefits of the voluntary hospitals are largely taken advantage of by the well-to-do classes (Conclusion 8, Part v, chapter i). The report of the Royal Commission on the Poor Law (Scotland), in reference to the city of Edinburgh, states that the low membership of friendly societies amongst a thrifty people can hardly fail to be connected with the large medical charities in Edinburgh. There is practically no attempt on the part of the inhabitants to provide medical aid for themselves on a provident basis.

These recent investigations clearly indicate that a good deal of abuse must be present, a fact to which every general medical practitioner can testify.

In preparing statistics of the seventeen large voluntary hospitals in Liverpool and Bootle, it was found that in the year 1908 the number of out-patients was over 228,000, and the number of attendances over 700,000. The total estimated population of Liverpool and Bootle was 821,644, so that the proportion of one person in every 3.6 ($3\frac{1}{2}$) of the citizens of Liverpool and Bootle sought charitable medical out-relief in 1908, and this was quite exclusive of over 77,000 cases treated under the Poor Law.

Naturally, in the distribution of such an enormous amount of medical charity there is ample room for abuse, and on inquiry as to the measures taken to prevent the abuse it was found that at some hospitals no special precautions were taken at all; at other hospitals it was left to the medical staff; and at other hospitals a clerk, an out-patient Sister, or a dispenser made some inquiries as regards each patient. To any one who has given special attention to the work it means that in Liverpool, I am sorry to say, very little is done to prevent abuse, and in my opinion the only people who think that no abuse, or

* This paper was read in the Section of Medical Sociology of the Annual Meeting at Liverpool, but owing to a misunderstanding was omitted from the report of the proceedings of the Section published in the JOURNAL on August 3rd.

very little, takes place are some of the members of the lay committees of the hospitals.

The out-patients can be divided into six classes:

1. A large number of cases for whose treatment the Poor Law authority are, or should be, responsible.
2. Persons suffering from chronic ailments.
3. Persons whose home conditions will not allow them to reap any commensurate benefit from such treatment.
4. Well-to-do persons who can afford to pay private practitioners.
5. Persons sufficiently well off to be able to join a provident institution or a public medical service.
6. The suitable persons for the out-patient department.

I have not included in this classification the children sent to the out-patient departments by the education authority because I have hope that before many months are over this gross abuse will be entirely swept away.

Class 1. The Poor Law cases ought always to be referred to the Poor Law authority.

Class 2. Persons suffering from chronic ailments; and Class 3, Persons whose home conditions will not allow them to reap any commensurate benefit from such treatment, ought, I consider, to be referred to a reformed Poor Law authority.

Class 4 and Class 5, the well-to-do and persons able to join a provident institution or a public medical service, should also be excluded from the out-patient department.

Class 6 contains the suitable persons for the out-patient department—that is, patients who are not able to pay for adequate treatment—of course making exception for cases of serious accident and of severe sudden illness.

The next question is, What should be the character of the work undertaken by the out-patient department?

I think it is now fairly well agreed that it should be used almost exclusively for (1) casualties, (2) consultations, and (3) cases requiring expensive equipment for the treatment of special diseases and defects.

Under such conditions the work would be so limited as to prevent overlapping between its sphere and that of the Poor Law authority; full scope would be left for private practice and provident effort; the work accomplished by the department would be more valuable and more efficient; it would not entail so arduous a task upon the medical staff; and the funds of the hospital would not be wasted.

At present each hospital is an isolated unit acting without any co-operation with other hospitals. Also when a patient leaves the hospital and arrives home the only evidence that he has been to the hospital is the existence of the wonderful "bottle." These conditions ought not to exist. All the hospitals in any town or city ought to co-operate with one another and also with various outside societies. These outside societies would follow the case up, and would help patients unable to help themselves in securing both proper nourishment and any other assistance for their families that might be necessary. This would give a much better chance of a more speedy recovery for the patient, by ensuring that the advice given at the hospital was fully carried out.

In order to bring about these reforms it is obvious that there must be some official attached to the hospital for the purpose of thoroughly weeding out all the various unsuitable classes to which I have referred; this official would co-operate with the various outside societies in following up the cases to their own homes, and would also help the patients, as far as opportunity allowed, to obtain surgical appliances, letters for convalescent homes, or any other such aid as the staff might consider them to need. Such an official is now known as an almoner, and a properly trained almoner is one who has been trained not only in the work of the out-patient department, but also in the work undertaken by the Charity Organization Society.

When the almoner is weeding out the various applicants for medical charity, she finds that no mere inquiry work, no fixed rate of rent, income, etc., is of much value; every case must be treated on its own merits, and no patient can be considered as an individual alone, but as a member of a family and a part of the community. This entails a great amount of personal work, time, and expenditure; but surely, if it is worth while for a physician or surgeon to devote long hours daily to the arduous task of the treatment of out-patients, it is only right to ensure that the treatment is not granted save to those who cannot afford to pay for it, and, moreover, that it is not rendered inadequate for want of help and care in carrying out the instructions laid down.

One or more almoners ought to be attached to each hospital; in some cases of small hospitals possibly one almoner could serve two hospitals, and all the almoners in any city ought to work in co-operation with one another, so as to avoid overlapping.

Hospitals which do not adopt this system cannot help having their out-patient departments considerably abused, and in cities and towns with more than one hospital there is a great amount of overlapping and inco-ordination, whereby considerable sums of money are wasted or improperly applied and much effort is rendered useless.

I therefore think that it is the primary duty of all hospital committees to take the strongest measures possible to see that the funds entrusted to them for charity are spent for that purpose in the best possible way, and this can only be done by employing one or more almoners as the case may be, and limiting the scope of the work undertaken in the out-patient department to casualties, consultations, and to cases requiring expensive equipment for the treatment of special diseases and defects.

EIGHTIETH ANNUAL MEETING

OF THE

British Medical Association.

Held in Liverpool on July 19th, 20th, 22nd, 23rd, 24th, 25th, and 26th.

PROCEEDINGS OF SECTIONS.

SECTION OF STATE MEDICINE.

A. K. Chalmers, M.D., President.

PRESIDENT'S INTRODUCTORY REMARKS.

After a few initial observations, including a reference to the fact that the two first meetings of the Section had been held in conjunction with the Sections of Bacteriology and Medical Sociology respectively, Dr. Chalmers said that he would like to take advantage of the occasion to enter a protest against the growing tendency to regard the work of preventive medicine as resulting only in flooding the population with inefficients. He could conceive no more grotesque or inaccurate description of the actual position. It was true that of recent years they had been afforded illustrations of much inefficiency, both mental and physical, and in a way these had been traced to certain groups of population and to definable circumstances. But these did not affect the population as a whole, nor even to a considerable extent, and once these conditions were more clearly understood, the remedy or avoidance might be possible. The whole movement, indeed, had been a forward one, and the future was full of hope. A second remark might be directed to the field of school medical inspection, which he thought was probably to too great an extent pathological rather than physiological in its objective. It was a valuable contribution to knowledge to ascertain in what proportion their children were handicapped physically; but they would reach higher levels if they endeavoured to group the mental equipment of the children, especially of those who were above the average. He hoped a time would come when in conjunction with the teachers the school medical inspector would be able to group children during their school life in accordance with their adaptability to and proficiency in certain forms of future work.

CHILDREN AND DENTAL DISEASES.

I.—R. J. Erskine Young, M.D.,

Dental Officer to the Liverpool Education Committee.

The deplorable dental condition of the poorer classes of society is already too well known to the dental profession, but it was only as recently as 1907 that certain municipal authorities realized this. After due consideration the

dental clinic at Cambridge was begun in July of that year, and in the same month of 1907 the Liverpool Education Committee felt justified in starting a dental clinic with a view to do something to combat the ravages of dental caries among the children of the day industrial schools of Liverpool and that at Hightown (at that time called the truant schools). Applications were duly invited, and the writer of this article was appointed "for three years as an experiment." At the end of that period—namely, October, 1910—my appointment was made permanent, as the clinic was believed to have done sufficient good to justify the step. There are five day industrial schools in this city, and that known as Addison Street Day Industrial School was chosen as being the most central, and a room with a good light was selected for the purpose of dental treatment.

A suitable equipment was provided by the Liverpool Education Subcommittee, and duly supplied to their order by the Dental Manufacturing Company of London. I remember saying at the time that this equipment was a movement to economy. There is an ordinary hospital rack chair, but were it not for the expense I would have much preferred the special children's chair which has been recently placed on the market by the Dental Manufacturing Company. In addition to the chair I have a Columbia engine for the preparation of cavities, bracket table, small "aseptic" cabinet, and the usual hand instruments and accessories.

Having begun with this modest though efficient equipment, I have endeavoured ever since the inception of my clinic to carry into practical effect the motto of "economy and efficiency," both as regards material used and unavoidable renewals and repairs.

The first step taken was to examine the teeth of all the children in all the six schools, and this examination has been repeated four times yearly since that time. On visiting each school the book-keeper makes a note of each child's requirements, as dictated by me after examination of the mouth. The work entailed by such examination is very great, and we have never attempted elaborate charting. Opposite the name of each child are two columns, the first for fillings required and the second for extractions. I rapidly review the mouth and count the number of cavities which can be inexpensively and beneficially filled, and that number is duly noted. I further take into account the number of teeth which are either unsavable, or which would require elaborate treatment, and that number is duly noted under extractions. Between forty and sixty children are examined in a morning, and this is continued thrice weekly for a fortnight. I can in this period examine all the children (about 1,000) attending all the day industrial schools. On the completion of my survey the children are sent to me alphabetically, except those in pain, who are, as far as possible, sent at once.

And now let me refer to actual treatment. I devote three half days of each week to the work, and as my efforts are unremitting the time given has proved ample. Owing to the necessity for economy only the simplest treatment has been adopted, and it largely consists of "cement" and "amalgam" fillings, and where necessary extractions. I am frequently asked, "How much work can you get through in a morning?" I once reached a total of twenty-eight fillings and extractions within one morning's work, but this was owing to exceptional circumstances, and my average morning's work consists of eight to fifteen dental operations. The plan adopted for this clinic in 1907 has worked well, as evidenced by increasing results.

Children and Pain.—The avoidance of pain in dental operating is of course an exceedingly important matter. Where I must extract it is done for the most part painlessly, by means of judicious employment of a local anaesthetic.

The giving of pain would mean not only that the children would be unnecessarily frightened, but the question of parental objection would arise. This brings me to speak of

A Clinic from the Parents' Standpoint.—The view taken by the parents of "dentistry for their children" is one that must be discounted, because of their profound ignorance—ignorance not only about their teeth but their health and education. One of the head teachers told me of a parent who came to the school and stormed and raged at her because her child's hair had been cut. I have doubtless received my share of abuse, and in one or two instances irate and ignorant parents have written to the Director of Education complaining that their child had received dental treatment, and that they did not want it, "because they did not believe in that sort of thing," etc.

I received a message from a child's mother saying "she preferred to see to Mary Jane's teeth herself," which meant not "seeing" to them at all. One tries to educate the parents, but, alas! how little effect it has. What is one to do if "Jimmy's teeth are not to be touched," or "Jemima is to have no teeth out," and yet both children need it badly, and perhaps their health is suffering accordingly. Be this as it may, the Education Committee's instructions are not to carry out treatment where a child's parents object, and this rule is adhered to.

As already said, it is very important to avoid pain, for the giving of pain to the children would in many cases still further alienate the parents' sympathy. In a few cases a parent has expressed gratitude, and I can say that if I meet a mother personally and tell her what is being done, and why, she seems satisfied, especially if I preface my remarks about her son's teeth by saying that "Tommy is a fine boy and inherits his good looks from her."

But this ignorance is, I am sorry to say, not confined to the uneducated classes. I have practised medicine for ten years and dentistry for nine. If (though comparisons are odious) I compare medical with dental patients, I can only say that the ignorance and unreasonableness of educated dental patients often amazes me. And I regret to be compelled to add that this applies in a measure even to members of the medical profession.

My own personal relationship with dental patients is a happy one, but there is, I fear, much more than a grain of truth in the statement that dental patients as a whole are too often unreasonable and ungrateful.

I know a dental surgeon who goes so far as to say that a conscientious, up-to-date, and gentle dental practitioner gives his life's blood in the service of his patients, so great is the physical and mental strain. It is, moreover, a notorious fact that dentists often die in their prime.

The Clinic from the Children's Standpoint.—I fear it must be admitted that, at least at first, the children were very sorry for themselves, and in some cases the child required a great deal of coaxing—much time being lost thereby. But it would appear as though I have gained the young people's confidence in a measure, for I now have very little trouble, and practically never resistance on the part of the child. For the most part the children and I are very good friends, and I believe I can attribute this to the fact that the work is, as a rule, painlessly done by means of a judicious use of local anaesthetics. Thus extractions, "drilling," and removal of nerves can be done without any pain whatever. One must remember, moreover, that the children tell each other, and, I have no doubt, compare their experiences in my dental chair. For instance, one child began to cry before she was touched. I asked her the reason, and she replied, "Tommy said you would stick a fork in my teeth." I promised to stick no fork in her teeth, and her tears ceased forthwith. Before dismissing a child (after treatment) a quite usual question is, "Did I give you pain?" or "Did you feel your teeth coming out?" Almost always the answer came, "No, sir," or "Very little, sir," and the child goes away comforted. The promise of a halfpenny or a penny to buy sweets (!) has an excellent effect. One baby of seven summers had some cavities filled, to which she objected strongly; but a kiss and a coin—chiefly the latter—purchased her forgiveness, and we parted quite good friends.

But the success of my clinic does not depend either on jokes, kisses or coins, as will be shown under "Evidence of Appreciation." It is essential to remember that, however desirous one may be to save the children's teeth, one must keep in mind the fact that there is a little sensitive nerve and a little frightened child at the end of each tooth. On the other hand, though one must be tender to the little ones, kindness must not be overdone. For many mistake kindness for weakness and take advantage accordingly.

Evidence of Appreciation on the Children's Part.—Do the children appreciate what I try to do for them? I believe they do, and some say so. I often get a child back after treatment just for inspection, and the following is our usual parting conversation: "Are you sorry you

have had your teeth out?" "No, sir." "Are you glad?" "Yes, sir." One baby of six asked three times in a week if her teeth might be attended to. She was *not* in pain.

A boy of about 10 years old sat down in my dental chair smiling, and said, "I am glad I am going to have my teeth done." After removal of a large molar without pain a youngster said, "It's very fine, sir. No, I am not sorry, sir; I'm glad," and he added an expression of appreciation from his mother, which need not be repeated. Another boy brought me a similar message to the effect that "she was very thankful and I was a nice doctor." I know of only one solitary case of the use by an industrial schoolboy of a home-made dentifrice. He remarked to me with much solemnity, "I clean my teeth every morning." I inquired his particular choice in dentifrices. He said, "I use salt and dust." "Dust," I said, "what kind of dust?" "My mother gets it from up the 'chimbley.'" "You mean soot?" "Yes, sir." Salt is sodium chloride and soot is charcoal, an excellent, if gritty, dentifrice!

I trust such incidents of my everyday work will serve to show that the children are beginning to appreciate what I try to do for them, and I hope that their dental education thus begun will bear fruit in the shape of a realization on their part: (1) Of the necessity for care of the teeth after leaving school, and (2) of the fact that our magnificent new dental hospital will welcome them if they have the sense to visit it at regular intervals.

The Clinic from the Writer's Standpoint.—Some years, I fear, will elapse before the great British public will become educated to the fact that the dental surgeon of to-day is a "specialist" in the same sense as the aural or ophthalmic surgeon. Nevertheless it is so. Looking, therefore, at the clinic from this standpoint, I am necessarily biassed in its favour as regards the benefits conferred on the children, not only as far as their teeth are concerned, but with a view to improve their health and stamina. Before the annual general meeting of the British Dental Association held at Liverpool in July, 1910, a paper entitled, "How to Save the Teeth of the Children" (by the writer of this article), was discussed. A dentist practising in London remarked during the discussion that I might have extended the title of it, and called it, "How to Save the Teeth *and Lives* of the Children." Such, indeed, is the Alpha and Omega of this and all other dental clinics. Why do I rarely see the red flannel which used to cover up enlarged and tuberculous glands in the neck? Wherefore the children's improved health and stamina? How comes it that cases of sore throat, headache, and neuralgia are met with only in a minor degree, and these chiefly among the new admissions? There is only one answer, and that is that they are due in a measure—perhaps a considerable measure—to the dental treatment the children have received since 1907. I consider that a conscientious and careful dental surgeon wages a daily and hourly warfare against disease.

Dental Disease and Consumption.—Amongst the most important of the maladies induced by dental disease is that awful "white scourge," tuberculosis. For many years I have held that consumption can be, and *is*, contracted through diseased teeth. Consequently, for every cavity filled, for every septic tooth extracted, we have aimed and struck a deadly blow against possible tuberculosis. Will mothers ever learn that the first tooth of the second set comes at the *back* of the mouth? It is the largest and amongst the most important teeth, and the most frequently diseased. I believe that I have saved hundreds of these first permanent molars of the children since the clinic was begun, and devoutly hope that out of these hundreds I have saved a few children from consumption. I am, however, no faddist, and have no desire to prove a connexion between pediculi and poor teeth, or between cut toes and caries. That is another way of saying that I am not one of those who think that the world revolves round a canine tooth. But I am very sure of this—that the mouth is responsible for a multitude of sins so far as disease is concerned, and it is the destiny of dentistry to combat and to cure them. What has the profession of medicine, and more especially State medicine, done for our national health and well-being? The whole civilized world is familiar with its beneficent and far-reaching effects in the prevention of disease.

Some people affect to scoff at vaccination. But did not Sir William Jenner sound the death knell of small-pox? And what of the work of the late Dr. Koch as regards his comma bacillus and cholera? Need I remind you of the relationship between the Klebs-Löffler bacillus and diphtheria, or of the connexion between the disease-carrying powers of the mosquito and malaria? What is being done daily in the splendidly equipped laboratories of this university with a view to the study of tropical diseases? And I do not require to recall to your minds the work of the late Professor Miller of Berlin and his study of the causes and pathology of dental caries. All this has been accomplished with a view to stamping out disease and the promotion of public health. And when we meet to discuss how to save the teeth of the children this is our object too. We want to anticipate and by early treatment prevent dental disease, and even more so the diseases caused by and secondary to it. So far, school dental clinics have done at least something towards the prevention of disease. Dyspepsia, anaemia, constipation, and general ill health are in many cases the result of diseased or defective teeth, and I have already made reference to the undoubted connexion between diseased teeth and consumption.

Now, in closing, just a word as to the Press and the dental education of the public. At the Birmingham Meeting of this Association last year I accused the Press of affording space for the publication of objectionable matter instead of utilizing their unique position to educate the public about their health. Mr. Editor replies, "My paper must pay"; and this is the explanation. But I must be just; for the *Liverpool Daily Post* and the *Liverpool Evening Express* have both rendered service by publishing educative articles, and thus both of these much appreciated papers have done something, though not nearly enough, towards the dental education of the people, and I should like to see other dailies follow their lead. Why cannot a man take up his pipe and his paper and learn how to keep his body healthy? What he does actually read too often is sordid detail in connexion with the latest divorce case.

My ideal newspaper is an *educative* newspaper. You ask what is my ideal dental clinic. It is one which of course must save the children's teeth in the first place, but I ask a lot more: I want to see dental clinics established in sufficient numbers in our large towns so as not only to cure dental disease, but to prevent the diseases resulting from it. Then it will be a case of State medicine and the profession of dentistry working hand in hand.

II.—J. Sim Wallace, M.D., D.Sc., L.D.S.,
Lecturer on Dental Surgery and Pathology, London Hospital.

In recent years it has been shown that there is no disease so prevalent as dental caries. There are few troubles of longer duration than are those of the teeth, for very frequently they begin in the cradle and only end with the grave. In addition to this it is recognized that dental ailments sooner or later give rise in some form or another to more or less serious maladies. Many widely different diseases, ranging, for example, from dento-alveolar abscess to cancer of the tongue, may result directly from diseased teeth, while those resulting indirectly know no limits. Furthermore, dental diseases frequently interfere with the normal development of the individual. This abnormal development naturally is most marked in the jaws, and it is safe to say that nine-tenths of the ugliness in the lower half of the face, which is so common at the present day, would straightway disappear were normal development not interfered with. The results of dental diseases are not always eradicable by medical treatment, and the amelioration of dento-facial ugliness is tedious, expensive, and most frequently not altogether satisfactory.

These are not the only reasons for directing attention to dental diseases in children. Not so many years ago dental diseases were supposed to be hereditary and practically unpreventable; now they are known to be almost invariably preventable, and the whole outlook on the means of prevention has accordingly been reconsidered. The foregoing considerations make the prevention of dental disease of primary importance, for if we prevent the diseases of the teeth, as we now know we can, many diseases, whether concomitant or consequent, will seldom occur, and the fabulous sums of money which are at present spent on their treatment may be used for far better purposes.

It is not my intention to go into the question at all fully as to how dental disease, and more especially dental caries, may be prevented. That is, perhaps, fairly well known to all who are engaged in the prevention of disease, and I have recently tried briefly, yet sufficiently, to explain this elsewhere.[1] Modern methods of preventing decay in teeth are based on a knowledge of the etiology of the disease. This has been very thoroughly studied, debated, and elucidated by the dental profession; but as a result of a disastrous omission from the medical curriculum, medical students are still kept in the most profound ignorance of the subject. It is now known that dental caries results from the undue lodgement of plaques of micro-organisms, together with fermentable carbohydrates, when the acid formed thereby is protected from the action of the saliva by the impermeability of the mass. This being so, we now recognize a new principle in dietetics—namely, that the food should be of such a nature, or the meals so arranged, that the mouth is left physiologically clean after food is eaten.

All animals, except those kept in captivity by man and subjected or restricted to unhygienic meals like children, have their teeth kept free from disease in this way, and no reasonable individual would say that the meals should be of such a nature or so arranged that the mouth will be kept in an unhygienic state. Yet this is what the dictates of those who have been teaching medical students dietetics have led to, and the deplorable result on the teeth is what no doubt compels this Section to seek to study the subject for itself, and see whether the remedy suggested by the dental profession is correct or not. Now the modern methods of prevention have been as astonishingly successful as the remedy is simple, and the parrot's cry that we will not get people to adopt it, is belied by the fact that we do get people to adopt it, and adopt it most willingly. Certainly, children are enthusiastic in its adoption, especially when fresh fruit after meals is supplied them. Moreover, they undoubtedly would prefer that the money, whether taken from the parents' pocket direct or extracted by the State, should be spent on fruit or some cleansing foodstuff, than that it should be spent on extracting, stopping, or regulating their teeth. In fact, after an experience of more than ten years of modern preventive methods, I can unhesitatingly say that the change to hygienic methods of feeding is welcomed by nine-tenths of the parents, as well as by a like number of the children, and were it not for the erroneous dictates which were established in ignorance of the principles referred to and preached with the assurance bred therefrom, two-thirds of the diseases of the teeth would rapidly vanish without further trouble.

Some of you may be somewhat incredulous, and at one time the great bulk of the dental profession was so, too; but even my claim that not only can caries be prevented, but that by modern methods it can be and has been arrested,[2] has not only been confirmed, but there is now little or no incredulity with regard to it at all. It is, indeed, recognized as obviously true, for it is seen that what takes place occasionally by chance can certainly at times be brought about by design now that we know the *rationale* of the prevention of the disease.

It may be said that modern preventive methods have been tried by set design only by the more intelligent and well-to-do classes, and it has been objected that the poor cannot afford to have their meals arranged in the simple but effective manner that has proved to be such a reliable method of preventing caries. Here it may be admitted that there will at first be some little difficulty. With the poor we can hardly hope to adopt the simple method of finishing a meal with a specially cleansing foodstuff as a routine procedure so long as it is regarded as expensive. Fortunately, however, the limitations which poverty itself enforces do also enforce to a certain extent hygienic foods and methods of feeding, and the fact that the very poorest children have more frequently good teeth than the richest indicates the truth of this assertion.

I would here like to refer to two of the main factors in the causation of dental diseases, and you will notice that the very poor are more generally likely to fare well than those better off. One of the factors in the etiology of caries is the pappy nature of the food which very young children are so frequently compelled to subsist upon. The soaking of bread in milk costs more than they can afford, and, moreover, the preparation of the pap is more troublesome than simply giving a young child a piece of bread to eat. The second point is that the very poor children have but few pennies to spend on sweets. This is an important matter, and, thanks to the excellent work of the medical officer of health for Salop, Dr. James Wheatley,[3] we are able to bring home this truth more effectually now than we ever were before. It is evident, from his statistics, that the eating of sweets by children is responsible for 50 per cent. of the decayed teeth in children at the present day. Think what this means. When accurate statistics have been taken, it has been shown that each school child has, on the average, some five to nine carious teeth. Let us put the average number at six; then a simple calculation leads us to the conclusion that there are some 21 million teeth in a state of ruin simply through eating sweets. It may be said that sugar is a cheap and excellent food for the poor. Statements of this kind are frequently even printed in medical books. But let us analyse the matter. Because of their poverty the poor cannot buy beef, mutton, and other foods of an albuminous nature, they are very largely compelled to get the protein they require from bread; in fact the poor live very largely on bread. For this reason they always tend to get a surfeit of carbohydrate if they get sufficient protein from this source. So we conclude that every penny spent on sugar as a food is practically wasted, or at least is only as justifiable as sending coal to Newcastle.

What is so often wanting in the diet of the very poor is sufficient protein, sufficient fat, and sufficient fresh vegetable juices, all of which are very helpful in keeping the teeth free from caries. But it may be said that our efforts in preventing children eating sweets will be of little avail. They certainly will be of little avail so long as the great authorities on dietetics are flooding the sources of information with reasons for regarding sugar as an important and inexpensive article of diet, ignoring at the same time its disastrous results and failing to indicate how sweets may be eaten without harm resulting. It is also difficult to prevent children after they reach school age from wasting their money on sweets if they have been brought up on pap, for pap-feeding causes a pathological craving for sweets. I have frequently called attention to the fact that children brought up on what we may call the physiological system have not got any marked liking for sugar; rather have they a marked liking for fish, flesh, fruit, and fat. In reference to this point Mr. George Thomson, in calling attention to the fact that the perverted taste for sweets was the cause of a great amount of dental caries, said, "Children who had been properly brought up did not naturally like sweet things, and he had abundant evidence on that point from all parts of the world."[4]

I need not pursue this part of the subject further. Suffice it to say that there are two things required to be done: (1) The fountains of erroneous dictates have got to be dried up; (2) the truth has to be brought home to parents with regard to the proper feeding of children, more especially during the first few years of life. Medical officers of health are in a far better position to do this than dentists, and until it is done the problem of the prevention or treatment of dental disease is utterly hopeless.

Now let us consider the treatment of dental disease in children. Together with the inculcation of true methods of prevention this is very desirable, but treatment is frequently advocated without any regard to prevention beyond toothbrush drill, and few seem to have realized how futile and expensive such a method of procedure is. Roughly speaking, we may calculate that there are some seven million children in Britain between the ages of 3 and 15 who require dental treatment. It is safe to say that on the average six teeth are carious in each child; in addition to this 50 per cent. of these children have their teeth crowded and irregular. Let us assume that it were possible by some prodigious effort to call into existence a sufficient number of dentists qualified to do the work efficiently—that is to say, to restore the teeth, and not simply to mutilate the dental arch by extracting them. Let it further be assumed that it were possible for these dentists to put every child's mouth into thorough repair within three years; we may as well give them three

years to do the work, because even first-rate operators sometimes take a year or two to complete the regulation of the teeth of a child, and it is important that the efficient regulation of teeth should be done, because if it is not throughout life there will be a distinct predisposition to dental caries, oral sepsis, and in later life pyorrhoea alveolaris. Let us assume that all this can be done for £1 per head; that is, 6s. 8d. per annum per child for the first three years—and this is a ridiculously low estimate if the work is to be done fairly thoroughly—then in three years there will have been an expenditure of some £7,000,000. As, when dental treatment is performed without modern preventive measures being taken, 75 per cent. of children require retreatment at the end of one year, at the end of three years, then, the treatment will all require to be recommenced and approximately the same amount voted to be uselessly thrown away, and so on *ad infinitum*. Here let me say that you may bemoan the cost of dental operations. You may, perhaps, get them done, in a way, on the cheap. But I venture to think it will be found that cheap dentistry is painfully dear in the long run.

In the past the well-to-do have chosen to go in for this method of procedure—that is to say, treatment *plus* the toothbrush—but there is no indication that dental disease among the well-to-do has been appreciably reduced. It is certainly not claimed that each successive generation is freer from dental disease because in each successive generation the treatment has been more thoroughly performed and the toothbrush more rigorously insisted upon. Correspondingly there is no evidence that the expenditure on dental treatment in the upper classes has been decreasing. The difficulty, if not impossibility, of raising the funds necessary for treatment has led some to fold their arms and do nothing, but in so doing they are doing a grievous wrong. It is the duty of at least a certain branch of the medical profession to do what they can to *prevent* diseases, and because the treatment of dental diseases cannot be undertaken as fully as they would like, this is no excuse for neglecting their opportunities in the way of prevention. Moreover, it is contended, and with truth, that it is only by prevention that the problem of the eradication of dental disease can be hoped for. Without expense the campaign for the prevention of dental diseases in children may at once be undertaken by medical officers of health. At one time I thought it would be advisable to have some one with expert knowledge of the means of preventing the diseases of the teeth to supervise the dental reports of school and health medical officers, but so long as such men as Dr. Newsholme and Sir George Newman are at the heads of their respective departments this seems unnecessary. To all intents and purposes, then, the knowledge and machinery already exists which is requisite for the prevention of dental disease, and were it not that many medical men regard the diseases of the teeth not as diseases in themselves of appreciable consequence, but rather as a source of originating disease, preventive measures would have been instituted years ago. But now that it is recognized by medical officers of health that "dental caries must be considered as an outward and visible sign of methods of living which produce other and greater harm," such an attitude can no longer be maintained. Gentlemen, some are born great, some achieve greatness, and some have greatness thrust upon them. The State Medical Service was born great because it was born of the idea of prevention. This service will certainly achieve greatness by the work it is doing, and will do, in preventing dental diseases. Assuredly it should not wait till this crowning achievement is thrust upon it. One thing is certain—the greatest triumph of preventive medicine will be in preventing dental and concomitant and consequent diseases, for this includes more than half of the diseases from which man suffers; and though dentists may derive some satisfaction from having elucidated the means of prevention and from having initiated the movement, yet the honour of making the campaign a brilliant and complete success will undoubtedly rest with the medical officers of health of Great Britain.

REFERENCES.

[1] *The Prevention of Dental Caries*, second edition, 1912. [2] Premier Congrès Français de Stomatologie, 1907. [3] Fourth Annual Report of the School Medical Officer to the Education Committee of the Salop County Council. [4] *British Dental Journal*, July 15th, 1912.

DISCUSSION.

Dr. J. J. BUCHAN (M.O.H., St. Helens) said that his own personal feeling in the matter was that the view that Dr. Sim Wallace put before them was the correct one. It was futile to expect that the end they wished to attain could be attained by conservative dentistry; it was hopeless, by treatment and retreatment of decayed teeth among children, to deal with the subject of dental disease. The amount of decay in the teeth of children was enormous, and if they allowed the present conditions to continue they would have to face the same difficulty. He could conceive of no sanitary authority being willing to take on treatment on the lines of conservative dentistry. Dr. Sim Wallace had put forward the idea that carbohydrate feeding was the main element in the causation of these diseases. He was not prepared wholly to accept Dr. Wallace's conclusions at present, but in his opinion they were justified in endeavouring to educate the public as to the danger of soft foodstuffs; but the whole subject had not yet been thoroughly worked out.

Dr. J. S. MACKINTOSH (London) said that the problem lay in a nutshell. In the days when we lived, as a nation, on the products of the land, foodstuffs were of such a simple nature as to require proper mastication, and, in his opinion, the amount of dental disease was due to the change in our national habits as to food.

Dr. F. E. WYNNE (Wigan) said that, accepting Dr. Sim Wallace's point of view, it seemed that dental caries was brought down to the underlying cause of all disease—namely, poverty. He would be glad to have suggestions from Dr. Wallace as to how medical officers of health were to improve the diet of the poor in this direction. He himself had not much faith in the possibility of the medical officers of health educating the poorer classes. He intended to confer with the Director of Education in his district as to some means of altering the diet of the children whom they had to feed, and would like to know how they were to get the mothers of the slum population to give the right kind of food to their children. In his opinion the greatest measure for the public health which could be adopted would be a general increase in wages all round.

Dr. CHALMERS (President), in closing the discussion, remarked on the danger of artificially prepared foods. Another aspect of the case that occurred to him was that modern novelists were very much to blame for having popularized the idea of good old people going about giving bags of sweets to children, and he thought they ought to cease writing up the value of sugar as a means of pleasing children.

DISCUSSION ON ISOLATION IN SCARLET FEVER.

OPENING PAPER.

By C. H. PHILLIPS, M.D.Durh.,
Medical Superintendent, Stoke Isolation Hospital.

THERE are three points in the isolation of scarlatina to which I wish to direct your attention and to invite an expression of opinion:

1. Are our hospitals as at present constructed the most suitable buildings for dealing with the disease?
2. Is the period of isolation at present adopted too long?
3. Is it not better to adopt more open-air treatment in dealing with the disease?

Upon the first question I have very decided ideas. Considering that isolation hospitals have been in existence over thirty years, the results expected from them have not been obtained. When first instituted it was confidently expected that by their means this disease would be brought under control, and might possibly become extinct—just as smallpox has become controlled by vaccination; but the number of isolation hospitals erected throughout the country shows that these expectations have not been fulfilled, more especially as they are continually having to be enlarged for increased numbers—and one wonders why this state of

affairs exists. Is it that the disease is one that is better dealt with at home and not requiring isolation, or is it that there is some defect in the construction of our hospitals? I am of opinion that the latter reason is the true one; and until we cease to mass the patients together in large wards and begin to classify and segregate each patient, so long will our hospitals prove a failure, no matter how well ventilated the large wards, with a disease like scarlatina. Where the germs of disease are practically living in the respiratory passages and given off by every breath, patients must of necessity infect each other and mild cases become contaminated with severe cases and complications of all sorts arise.

Isolation hospitals have been earning for themselves very unenviable names owing to this, and it is a condition of things that need not exist if the proper steps are taken. Each patient should be treated as likely to be dangerous to his neighbour, and properly and thoroughly isolated. Then all fear of cross infection ceases, and mild cases can be more readily discharged from hospital and the cost of maintenance lessened. In erecting suitable buildings to carry out this individual isolation the initial outlay may be greater, but the saving on the cost per head for maintenance on each patient and the shorter duration in hospital would pay for this extra outlay.

My second point: Is the period of detention in hospital too long? The answer is that in all mild and uncomplicated cases (that is, having no discharges), four weeks in hospital is quite long enough, and waiting until all desquamation ceases is not required. If the proper and suitable provision has been made for isolating patients and treatment given from commencement to throat and nose and skin of a sufficient character to ensure thorough disinfection of these parts, then the latter stages of desquamation may safely be disregarded.

I do not claim any originality on this question of shortening the period of isolation, but have seen the ill effects and difficulties produced by large crowded wards in my own hospital. By "crowded" I mean two beds in buildings which were meant to have only one and air space per bed limited. I made inquiries from medical superintendents of isolation hospitals throughout Great Britain as to the views held in each hospital on the question of limiting the stay in mild cases. Fifty institutions were communicated with. Twenty-three took no notice of the request. I collected and tabulated the opinions from twenty-seven institutions.

The most pronounced opinion is one given by Dr. Milne, of Dr. Barnardo's Homes, in which he states:

> I do not isolate any cases in any way; they are kept in the general wards of the hospitals, side by side with serious operations, and in the dormitories along with other healthy children; also I do not isolate measles or diphtheria, but rely entirely for scarlatina patients upon treatment by swabbing the throat with 10 per cent. of carbolic oil, and rubbing body all over with pure eucalyptus oil. And I get no return cases, although the children go back to school in ten days.

Dr. Lander, M.O.H. of Southampton, considers the subject of much medical and public importance, although the conclusions he arrived at are not altogether in accordance with those usually accepted. In an address which was given to the medical men at Southampton in 1904, he pointed out that return cases are not attributable to the peeling condition of the patient, as generally concluded, but to the undetected discharges from mouth, throat, nose, and ears. He bases these remarks on the fact that neither prolonged stay in hospital nor absence of desquamation assist in preventing return cases.

His suggested remedy is the segregation of mild and convalescent cases (free from complication) at the end of three weeks, bathe daily, douche throat daily, pass through out-bathing station, and to discharge at the end of the fourth week, no matter what the condition with regard to peeling. He also states that further benefit would result from the complete and continued separation of each individual case. His statistics show that mild cases average twenty-eight days in hospital, and complicated cases fifty days. Dr. Moore, of Huddersfield, states that in advancing the theory that desquamation may be disregarded as evidence of the infectivity of persons convalescent from scarlatina it is necessary to define what is meant. Particles of epithelium exfoliated from the bodies of persons suffering from an infectious disease, during the infectivity thereof, of course are infectious, just as are all articles of underclothing and bedclothing with which the patient is in contact; but in like manner as these articles may be disinfected when the acute stage of the disease has passed away, so may be disinfected the peeling skin. It is not beyond the resources of medicine to disinfect the surface of the body for practical purposes—that is, the surgeon's idea of absolutely aseptic hands.

Desquamation continues long after convalescence has been completely established and temperature normal for weeks. The infectivity of scarlatina begins before desquamation commences, and may continue long after the process is completed—evidence that it is not essentially associated therewith but independent—that both are mutually independent. Huddersfield's period of isolation is twenty-nine days under the new system; previously the average was 44.3 days.

From sixteen hospitals replies were received to the effect that they could produce no definite evidence that desquamation *per se* was a source of infection, and that too much importance in the past had been attached to desquamation as a source of infection, and that experience did not support the popular view that a desquamating patient was necessarily an infective one.

From five hospitals the replies were of a less definite nature.

Six hospitals still believe in desquamative infection.

The medical superintendent of the Eastern Fever Hospital, Metropolitan Asylums Board, states: "I have been discharging patients while they are still desquamating since the beginning of 1903. Complicated cases and severe cases are seldom fit to leave hospital so soon, but I am certainly prepared to recommend other authorities to sanction the discharge of mild uncomplicated cases at the end of four weeks."

Amongst the six hospitals which still believe desquamation infectious, five have schools of medicine attached to them. Is it not desirable that a systematic attempt should be made at some of these larger institutions to ascertain whether it is not possible to make a reduction in the period of isolation of scarlatina patients? Individual towns have found it a success, why not the towns where universities and schools of medicine exist?

Difficulties will be met with in adopting this limited period of isolation, and will arise chiefly from the views held by the medical profession, who are always reluctant and unwilling to accept any innovation, and until the bulk of the profession can agree to give this system a trial it will be difficult to carry out. The medical profession will have to be relied upon to help to educate the minds of the laity to accept this change of opinion.

Dr. Caiger, who is the writer of the article upon scarlatina in Allbutt's *System of Medicine*, latest edition, on p. 418 states, "Of recent years the infectivity of the cuticle in the later stages of scarlatinal peeling has been seriously questioned, and it is now the common practice of many physicians, whose wide experience entitles them to be heard, practically to ignore the peeling in its later stages and to discharge patients fit in other respects quite irrespective of its progress; and it is probable that for the majority of scarlatinal patients a six weeks' isolation is quite unnecessary, and might be curtailed by one or two weeks."

An expression of opinion like this, coming from a writer of note, is one that might be followed out. If it is possible to reduce the period of isolation, it is certainly a step which ought to be taken in hand at once, both on the patient's account and also on account of the costliness of the longer period of isolation. To bring about this change it may be necessary to make some structural alterations in present buildings, but the cost of this would be met by the lessened cost of maintaining patients. One question to be borne in mind is that the work must be done thoroughly to ensure that return cases are not increased. The system that appears to be most likely to give success is the classifying of cases, and segregating in buildings specially kept for each form of the disease. To the lay mind—and, unfortunately, to the mind of many medical men—scarlatina is a simple disease, which is shown by a little fever, sore throat, and a rash, and runs a definite course of a few days, then peeling, and the patient ought to be quite well. This unfortunately is not the experience of medical superintendents of isolation hospitals, and whether it is that

cases sent into isolation hospitals differ in severity from those kept at home, or whether it is that cases sent in are made worse by being brought into wards which are entirely given up to the treatment of scarlatina, there is the fact that cases sent into hospital differ greatly in severity in many cases, and have frequently some of the symptoms greatly exaggerated, and hence it becomes necessary that a strict division and classification of cases should be carried out—otherwise a mild case may contract some further exaggeration of one or other symptom, especially of throat or nose, and thus unduly prolong the stay in hospital.

A still further need for separate wards for segregation of cases arises from the fact that in most isolation hospitals there are times when doubtful cases are sent in, which afterwards take on scarlatina. All this may appear outside the question of limiting the period of isolation; but I do not consider it so. It is both essential and important that more attention should be given to the classification and separation of all these different cases, and it then becomes possible to keep those that are really only mild cases free from contracting any further form of the disease, and by so doing enable them to be discharged earlier.

If the system of dividing the wards by glass partitions s carried out, giving each bed its own proper amount of air space, the cubicles can easily be thoroughly stoved after the discharge of each patient and kept in proper sanitary condition—a thing impossible in large wards, except at stated intervals.

I agree with the opinions of medical men, whose names I have mentioned, that with isolation properly carried out and suitable treatment given in the early stages of the disease, it is quite possible to allow patients out at the end of four weeks, and that the source of infection does not exist in the desquamating cuticle, but in the discharges from throat and nose, and that it is quite possible to turn out patients free from any infection in either of the two parts last mentioned. But to ensure this there must be greater purity of atmosphere in the wards, and no overcrowding, and more systematic segregation, and more open-air treatment.

Through overcrowding at the hospital of which I have charge, 1,350 patients were sent for convalescence to an empty small-pox hospital, with iron pavilions, in which the air space per bed was limited—not more than 750 ft. The patients practically lived an outdoor life. Sent at the end of the third week, they remained until discharged.

Complications arose in about 1½ per cent. of cases, from want of air space, and earth closets. These cases were returned to the first hospital. There was one death only, and the remainder of the cases did well. And in these cases I do not hesitate to say that they might all have been discharged at the end of the fourth week, but for the unfortunate belief that the desquamating skin was infectious. If they had been discharged at the end of the fourth week the saving to the rates would have been very great.

My third point is a plea for the trial of more outdoor treatment of cases of scarlatina after three weeks of isolation, and where there are no complications. If the patients are warmly clad, I consider that the more time they spend out of doors—either winter or summer, when the weather is fine—the better recovery they make. This has been my experience.

I will conclude my paper—which may contain nothing new to you—by stating that I consider the subject one of much medical and public importance; hence my bringing it before your notice.

DISCUSSION.

Dr. LESLIE RUNDLE (Liverpool) dwelt on the importance of treating infectious diseases aseptically. He said that during the last two and a half years he had treated 900 patients at Fazakerley, and had only had two cases of cross infection, both being cases of scarlet fever. He was accustomed to treat several different kinds of infectious disease in the same ward, and the question might be asked, If all these cases can be treated in one ward, why should they not be treated at home? There could be no doubt, in the light of modern research, that infectious diseases were spread by contact infection, by which he meant any means which involved the transfer of moist particles from one individual to another. He preferred not to multiply wards, and considered that his method of treatment necessitated a very high quality of trained nursing, which could not be expected from a mother nursing her child at home. With regard to fresh air treatment of infectious diseases, he quite agreed with Dr. Phillips's views, and was in the habit of treating scarlet fever in a similar way to tuberculous cases. In his opinion Dr. Milne's home treatment by inunction and throat swabbing was now discredited. He did not believe that the isolation of scarlet fever had proved an absolute failure.

Dr. JOHN MULVANY (Portsmouth) believed it was not desirable in the public interest to extend the accommodation for scarlet fever patients. For the past thirty years vast sums of money had been expended by urban authorities in building isolation hospitals, and yet the disease had not been lessened. He suggested that fully 40 per cent. of cases could be treated quite as well at home; he would reserve isolation hospitals for the children of the poor, particularly those who lived in houses where little means existed for taking aseptic precautions and where sanitary conditions were not conducive to good health.

Dr. JOHN M. DAY (Dublin) pointed out that the poison of scarlet fever in 99 per cent. of cases entered by the throat and developed there, and till the throat was quite healthy again the patient was not free from infection; he therefore recommended the removal of enlarged tonsils in convalescent cases before discharge, otherwise he would not guarantee the patient to be free from infection. He was strongly in favour of convalescent homes in the country for scarlet fever. He did not agree with Dr. Rundle's method of treating cases of scarlet fever, measles, etc., in one large ward, but preferred putting different diseases into several small wards. He considered it was quite easy for one nurse to look after more than one small ward, and that there was no risk of cross infection if she used antiseptic precautions. Return cases were often due, in his opinion, to mild cases not sent into hospital, or to clothes put by and not disinfected until the child was ready to leave hospital. He contended that no child should be discharged direct from a scarlatina ward unless the case could be isolated at home.

The PRESIDENT remarked that this question of isolation in scarlet fever was a most important one. Theoretically, one might handle scarlet fever in any way one liked, but practically it could only be handled aseptically. The aseptic method of carrying this out could be done in most private houses, and treatment of scarlet fever was apparently successful, whether one agreed with Dr. Milne or with Dr. Rundle. He thought one of the errors of the Local Government Board was that they laid more emphasis upon the provision of cubic space than on that of floor space in hospitals, but, in his opinion, as the gunner liked to have plenty of space to work his guns, so in dealing with scarlet fever it was more important to have plenty of floor space round their beds than to have cubic space. He regarded desquamation as at least a potential source of infection in scarlet fever.

VISUAL DEFECTS IN CHILDREN:

THEIR MANAGEMENT UNDER MEDICAL INSPECTION.

By A. A. BRADBURNE, F.R.C.S.Edin.,
Manchester.

THE advent of the Medical Inspection Act has brought many problems in its train connected with the management of adolescence. Not the least of such problems pertains to affections of the visual organs. The treatment of ophthalmic affections has for generations past been held to be a branch of medicine which entails special training and experience, and from the nature of the work is reserved for the sphere of the specialist.

Under the scheme of medical inspection inroads are being made into this sphere by men who have at the same time to be well versed in other branches of medicine. It is therefore important, in the interests of inspectors and inspected, that the limits to such inroads should be clearly

defined and recognized. The aim of the Act is, I take it, to first of all detect errors, and secondly to see that they are corrected. From this we are not to infer that both duties are to be carried out by the same individual, as some authorities seem inclined to think. The management of eye cases under the Act should be limited to detection of the common ailments and errors of vision, and only under very special and limited circumstances should attempts at their rectification be asked for or permitted.

The usually adopted method for detection of the visual errors consists in testing the ability to read certain sized letters at some specified distance. Some authorities go further than this and insist on their inspectors possessing sufficient knowledge to correct the visual errors by prescribing glasses.

Both methods are open to objections and criticism. In the first place, inspection dependent upon the ability to read letters or symbols, though a useful measure, is of little value when unsupported by other corroborative means. The child under examination may be nervous, ignorant, or wayward; the letters soon get dirty and discoloured; I have seen them even of a yellowish-brown shade. Again, the source of illumination varies at different schools and according to the time of day or the season of the year, and some letters are more easily read and memorized than others. It is obvious that for any scientific value such tests are absolutely untrustworthy.

The test to be of any value should have the letters printed on a clean white non-reflecting paper, and framed and glazed so as to remain clean. To prevent memorizing, the board should be reversible, having another set on the other side, and it should also be provided with its own illuminant, so that the light standard should be a constant one. The test, however, has one very grave defect which in itself condemns it, and that is, it passes over without detection cases of incipient short sight.

To carry out visual inspection efficiently there is no better method than that which skiascopy affords; the letter test would then be used solely as a means of settling in certain cases whether glasses could be dispensed with, and as to the correctness of those ordered. The shadow test furnishes us with not only a thoroughly reliable, but, with a little practice, a quick and accurate method of determining the nature of the case. It at once detects short sight, spasm of accommodation, reveals promptly the "bar" indicative of astigmatism, the faceted cornea, for which glasses are generally useless, and hence forms a great time saver. It reveals by the slow dragging movement of the shadow high degrees of long sight, and with practice even low degrees can be quickly discovered. It further, by the position of the "corneal reflex," detects want of parallelism of the optic axes such as occurs in squint and latent divergence or convergence.

To obtain the best results the flat mirror is far better than the concave, and the sight hole should be at least 5 mm. in diameter. This method, it is true, necessitates the employment of a darkened room, but with very little difficulty this can generally be obtained in most schools. A portable Argand burner is the most convenient means of obtaining an illuminant.

The medical inspection as regards a child's eyes should consist of, first, an examination in good daylight of the external condition of the eyes; then the letter test should be made under the conditions laid down; and, finally, the eye should be examined by means of the mirror test. At this latter we should reject at once for further examination all cases which show a shadow which moves in an opposite direction to that of the mirror, all cases which show the "bar" of astigmatism, and all cases in which there is any slowing of the mirror movement. When, however, these errors are present in one eye only, the fellow possessing normal vision, I am inclined to think that in many cases we are justified in leaving them alone. This exception does not apply to cases which show a reversal of the shadow, for all such require attention from the fact that the condition may progress. It must be remembered that glasses for the great majority of the children attending the board schools are likely to become an impediment to future employment, and are a constant drain on the finances of the parents.

This fact should be always kept in mind, and in a child who has one normal eye and one with a high refractive error, it is a very open question whether glasses should be ordered at all.

If you give them under such circumstances to young children, you tend to awaken the faculty of binocular vision, which condemns the wearer to use them for the rest of his life. Further, it must not be forgotten that when the faulty eye wears a high correcting cylinder, a strain is thrown on the oblique muscles if the two eyes are to work in complete unison. If binocular vision do not ensue, the only advantage obtained is the prevention of the onset of a "non-use" of the eye developing, which is unlikely, as by the age of six this has, or has not, occurred.

After the nature of the refraction has been ascertained by the mirror test, the question arises as to the standard of vision which would justify us in not ordering glasses. This question cannot be answered definitely, as so much depends upon the "status" of the child; if poor and likely to remain one of the labouring classes, a standard of as low as $\frac{6}{12}$ vision might be allowed to pass unglassed, provided, of course, that the case be not one of short sight. If, however, a clerkship or similar calling form the future outlook, it would be necessary to raise the standard to at least $\frac{6}{9}$ in one eye and $\frac{6}{6}$ in the other.

Cases of astigmatism come under a different category; it is advisable to correct all cases in which the axis of the astigmatism in one or both eyes is oblique, or when it varies in direction in either eye, or when present in one eye and not in the other. The reason for this is the strain which oblique astigmatism makes on the obliques in the interests of binocular vision. Low degrees of astigmatism when at right angles would probably pass the test by the letters, and unless giving rise to symptoms need not be corrected. If symptoms arise they must not be sought for in the eyes alone, but in the effects on the general health and the progress which the child makes at his lessons. A weak, anaemic child, or a mentally backward one, becomes wonderfully transformed when small degrees of astigmatism are properly corrected.

I have said that all cases showing a "myopic" shadow should be refracted under a mydriatic. This will result in many cases of apparent short sight turning out to be "spasm of accommodation"—that is, low degrees of long sight. Now such cases will require glasses for a year or two, not only to prevent the recurrence of the spasm but to lessen the excess of convergence which tends to produce a lengthening of the eyeball when the tunics are at all weak, thus setting up short sight. For the same reason the low spherical error which accompanies compound astigmatism should be also fully corrected to prevent the case developing into one of mixed astigmatism.

Every short-sighted case requires to be fully corrected, and, what is still more important, should be re-examined again in six months' time to ascertain if the case be progressing. If no change be found at the re-examination, the next need only be after an interval of twelve months, which should be repeated yearly for at least three years. Any alteration calls for re-examination in six months. The prescribing of glasses does not end the management of these cases; it is the duty of the inspector to see for himself that the position of the child's desk is at a proper height, that the light is good, the print of the books large and clear, and the general health of each child should be made the special care of the family medical attendant.

I have pointed out that management of eye cases under the Act consists in detection of visual defects and the adoption of appropriate measures for their rectification. This does not entail, as some authorities seem to think, the right to treat them themselves, or, on the other hand, to flood the out-patient department of the hospitals. Many authorities now are adopting the intermediate and wiser plan of employing a part-time specialist, leaving those requiring hospital treatment to attend such places, and placing the simpler cases under the management of the inspectors themselves to deal with. It is this latter aspect of the case which requires consideration—that is, how far is the medical inspector justified in undertaking the treatment of the eye cases he meets with?

Several factors determine the answer to this question, such as the degree of skill and experience of the inspector, the nature of the defect, the amount of time which can be devoted to the work, and the means at his disposal for obtaining more skilled advice. At some schools the

inspectors are expected to prescribe glasses in the course of the rounds at the schools. My own experience of the difficulties associated with the performance of such work, the attendant noises of the teaching going on in the class-rooms, the poorly-lighted stuffy rooms which one has to make shift with for dark rooms, etc., make one hesitate to believe that accurate refraction is possible under such circumstances.

If, from force of circumstances, such as the distance from a local special hospital, the work has to be done, then a special room at specified hours, with leisure to work, should always be insisted upon. Even then there are limits to the work which ought to be justifiably undertaken. The inspector must necessarily be fairly skilled in refraction, and he should only prescribe glasses with which he can obtain normal vision after the mydriatic has passed off.

To this rule there should be no exception. One of the difficulties which crops up in doing refraction work is the use of a mydriatic. Some inspectors instil homatropine and send the children on or refract them the same day. This, to my mind, is absolutely useless. Atropine, in the form of the ointment, is the only reliable method, and this will produce fallacies unless used for at least four or five days three times a day previously.

The subject of the management of visual defects in children includes also the management of the parents, and in many cases it forms a great obstacle. Parental obtuseness arises from prejudice to the wearing of glasses, and objection to interference between them and their children; many consider it a personal slight that any defect should even be suspected in their offspring. Tact and explanatory talk will conquer the majority, but there will always remain a certain number of parents upon whom no argument will prevail, and unless they are confronted with the majesty of the law to compel them the child will become incapacitated or even suffer damage. This is now at the disposal of the education authorities, and it ought to be enforced to the advantage of the children, and the institution of proceedings in a few cases would soon have the effect of showing that the authorities were not to be trifled with. Unfortunately there are some Education Committees who fail to do this, and by so acting are neglecting the duty they owe to the next generation and to the medical men who work under them. The supineness of some bodies has been attributed to the fear of the "vote factor." Personally one can scarcely believe that any right-minded body of men would allow themselves to be biassed by so low a motive. In this brief summary of the subject many other points, I realize, have been omitted, but the majority pertain to the purely technical side of the subject, which calls for consideration by other sections of the profession. One point there is, however, to which I feel I ought to allude, and that is, Why should the benefits which inspection so obviously affords to the youth of this country be limited to the class who attend our board schools? Surely, if efficient vision is necessary to members of the working classes, it is doubly so to those who attend our private schools, where the scholars have to live and learn and become far more dependent on good eyesight than those of any other class. If inspection is compulsory in one class, it ought to be made compulsory for every child, no matter what his station or that of the parents is.

DISCUSSION ON ADMINISTRATIVE MEASURES CONSEQUENT UPON THE COMPULSORY NOTIFICATION OF PHTHISIS.

OPENING PAPERS.

I.—JOHN C. MCVAIL, M.D., LL.D.

IT has taken thirty years for Koch's discovery of the bacillus of tuberculosis to yield the fruit of compulsory notification of phthisis, and the object of our discussion is to determine how notification can be best used, alike for the welfare of the infected person and for the protection of those who are exposed to serious danger, whether due to hereditary tendency, or to conditions of life, or to both.

It should be noted that this is not a discussion regarding sanatorium benefit or the Insurance Act, notification of phthisis being independent of that Act. Compulsory notification is a means to an end; it is never an end in itself. Notification will of course be made to the medical officer of health. How is he to exert the powers conferred by the Public Health Acts? In ascertaining the facts of each case it will be very desirable that he shall have before him a good deal more information than is furnished in an ordinary notification certificate. That should be obtainable, under proper terms and conditions, from the medical attendant when there is one. Assuming he has this information, it will be the duty of the medical officer to advise the local authority as to what shall be done with the case.

There are a number of alternatives. The patient may go to a sanatorium, a hospital, or a home; he may be treated in a shelter in a garden at his own home, or be sent into the country to friends where home treatment would be carried out. In making a choice between these alternatives the decision will depend on facts relating to the patient, the household, the house, the available nursing, and the cost. Phthisis is different from all other infectious diseases. In scarlet fever or diphtheria there is usually no hesitation in sending to hospital a patient who is fit for removal, because it is known that he will be out again in six or eight weeks; but in regard to phthisis the feelings of the individual and his friends have to be considered within reasonable limits in determining what is to be done with him. It is one thing to order isolation for a few weeks, and quite another to compel a father or mother to go to a hospital for months with no hope of recovery. Human affections have to be considered.

Another set of facts to be borne in mind will be those relating to the household—that is, to the contacts; their condition as to health, any hereditary tuberculous tendency that may exist, and the family income. The possibility of the patient being kept at home will be considered, and in that connexion one question will be whether he is an insured person entitled to 10s. sick benefit and 5s. disablement benefit afterwards. One assumes that the medical officer of health will want to know the condition of every person in the house, and his measures will depend to some extent upon that. Facts relating to the house itself are important—whether the patient can have a room to himself, or a bed to himself; whether the house is properly ventilated and clean; whether those at home can be trusted to give attention to the patient; the possibilities of nursing—all these details will come up for review. The local authority will have to look to the question of cost, and whether institutions are available—whether a sanatorium exists for cases likely to recover, and an isolation hospital for cases where the risk is to the family. Naturally the cost of removal to an institution will be less when the local authority owns it than when it has to arrange for a weekly payment per case to an outside institution.

In connexion with cost the question will arise of the treatment of the patient at home. This will bring public health authorities face to face with problems that have hardly been before them in the past. In Scotland they have normally confined themselves to the treatment in institutions of suitable cases of infectious disease. Now they will have to consider the question whether they are prepared to pay for treatment of tuberculosis in non-insured persons at home. In my experience they have not given home treatment in scarlet fever or diphtheria or any other infectious disease. But phthisis having been made a notifiable disease, the duty of the public health authority with regard to its control in non-insured persons will be no less onerous than the duty of the Insurance Committees with regard to insured persons. Assuming the number of insured persons suffering from phthisis to be one-third of the total, the public health authority will have the other two-thirds to deal with. This at once brings us to the interim report of the Departmental Committee on Tuberculosis, and to the subject of the tuberculosis dispensary and tuberculosis officer. The tuberculosis officer and his staff will have relation not merely to insured persons, but to the whole tuberculous community. The relationship of the Insurance Act to this problem is, briefly, twofold—the Act devotes 1½ millions to sanatoriums, but this grant is in no way confined to insured

persons. The Astor report did not contemplate that the money would be devoted to providing the whole of the cost of institutions, but only, perhaps, three-fifths of the cost per bed. The other factor is the accumulation of 1s. 3d. per annum in respect of every insured person, for administration of sanatorium benefit. This will provide £1,250 per annum for every 20,000 of the insured population. The Insurance Act does something else. A penny per insured person is set aside for research; this will yield about £50,000 or £60,000 per annum, and it will be, I believe, a most valuable aid in the crusade against consumption. Research in the past has not been much encouraged in this country. If a man devotes himself to research in the engineering laboratory he has his reward in the profit that will come to him from a valuable patent, but in the case of medical research the public gets the benefit right away, and the investigator gets little directly.

The Housing Act is a very valuable factor amongst the agencies available for fighting tuberculosis. The Act contains two important sections in this connexion. One is Section 17, which deals with closure of houses; the other is Section 15, which deals with renovation of defective houses not so bad as to require closure. It is the duty of the local authority to examine every working-class house. If there are defects, the owner is to have the opportunity of remedying them, but, if he does not, the local authority is to proceed forthwith, charging the cost against the property. It is empowered to collect the rent for several years to recoup itself for the expenditure.

There is thus a combination of forces attempting to attack tuberculosis in a way it has never been attacked before. One factor is still wanting, and that is legislation with regard to milk, but it is hoped that this will not be long delayed.

II.—JAMES NIVEN, M.A., M.B.,
M.O.H., Manchester.

BY successive orders of the Local Government Board tuberculosis of the lung has been made compulsorily notifiable to medical officers of health, first, when coming to the notice of any medical officer of the Poor Law, then when recognized at a public voluntary institution, and finally, in 1912, when coming to the notice of any medical practitioner. The disease has been definitely declared to be infectious, and the medical officer of health is required to inquire into each individual case notified. Ample powers are given by these orders to local authorities to give to such cases any assistance and materials which their illness may require.

How far the instructions of the Local Government Board are being generally carried out I have no means of knowing. But it would appear from the National Insurance Act (1911) that Parliament does not rely upon all local authorities to carry out unaided the necessary measures of inquiry, treatment, and prevention. For under that Act and the Finance Act (1911) provision is made of £1,500,000 to aid in the construction of sanatoriums for the purposes of such treatment, while a sum estimated at £880,000 is reserved from the insurance funds for the treatment of insured persons and their dependants (sanatorium benefit). This provision should give a powerful impetus to local authorities to take active measures for the reduction of tuberculosis, and no doubt will do so. A Special Committee was appointed on February 22nd, 1912, to report to the Chancellor of the Exchequer on the best mode of expending these sums of money, and more generally on the measures of prevention and treatment required. In this report it is taken for granted that certain measures of precaution will be taken by public health authorities, and it is proposed to establish two new units—the dispensary and the sanatorium. As regards the dispensary, it is only necessary to say that, while it is expected to discharge important clinical functions, it is also credited with etiological inquiries which are now discharged by some public health officers, and which should be generally discharged by them. Nevertheless, it is possible that in some localities it will be found necessary that etiological inquiry should be left to the officers of the dispensary about to be appointed. There is to be one dispensary in proportion to every 150,000 to 200,000 of the population. A chief tuberculosis officer is to be appointed in connexion with the dispensary, who is to be independent of any other medical man in clinical matters. He will advise local Insurance Committees as to the distribution of sanatorium benefit. The medical officers of sanatoriums are also to have a voice in regard to cases sent to them.

If this proposal is carried out in its entirety, the medical officer of health will have no voice in determining the suitability of cases for institutional treatment, whether insured or not insured. It is expected, however, that a certain amount of elasticity will be observed in regard to the schemes put forward for different localities.

It is not needful to spend time in discussing the details of this report, which all of you have read, no doubt. It is, however, desirable and even necessary to consider the object at which we are all aiming, namely, the suppression of tuberculosis. Public health officers recognize generally the infectious nature of the disease, and the conditions under which it spreads most easily. Such conditions comprise occupations specially injurious to the lungs, as well as those which inflict a severe strain on the constitution generally; feebleness of constitution and previous illnesses; the effects of personal habits; overcrowding; dwellings damp, dark, dirty, or defective in movement of air; exposure to repeated infections; insufficiency of food and clothing.

When a case of tuberculosis is notified to the medical officer of health it is his duty to ascertain these injurious conditions so that they may be as far as practicable removed. He must also ascertain the condition of health of other members of the family, and see that those requiring medical treatment receive it. It is his business to get in touch with persons having suspicious illnesses who have been in intimate contact with the notified case before and after his illness developed. It is eminently his business to determine in what cases removal to an institution is urgent and in what cases it is not urgent, so far as the prevention of infection is concerned. He sees that personal instructions are given with a view to the prevention of infection of other members of the household, and furnishes the materials required so that they may be carried out. He determines the amount of disinfection required and gives instructions accordingly. In doubtful cases he has the expectorations examined. He sees that the patient and his family are assisted as far as practicable. In fact, he carries out practically all the measures assigned to the Public Health Office and dispensary combined. If he does not do so, or is hindered from doing so, the machine creaks directly.

It is of interest to consider what is now being done in connexion with the treatment of tuberculosis in Manchester. In the half-year ending December, 1911, the number of cases of tuberculosis of the lung notified to the medical officer of health by private practitioners numbered between one-fifth and one-sixth of the total, while in the first half of 1912 under the new order they number between one-half and one-third. The greater part of the work in Manchester is carried on at present by public institutions. I estimate that the institutional treatment of tuberculosis in Manchester patients may cost the guardians at present in round figures £26,000; voluntary institutions, £15,000; and the Corporation, £8,000; total, £49,000.

The public health administration costs £5,600, not including the part-time services of a number of officers not specially allotted to tuberculosis. How much is paid to practitioners one has no means of estimating, but it must be a large sum.

The amount of the annual grant under the Insurance Act which falls to come to Manchester may amount to £14,000. Expenditure will be involved, however, where now there is none. The consulting and advisory staff required will cost a considerable sum, and payment will have to be made to physicians who now do the work gratuitously, the more so that responsible duties will be placed upon them for which they are now paid, but will cease to be so.

Payment will have to be made for the treatment of cases of tuberculosis in sanatoriums the expenses of which are now defrayed by charity, since it is anticipated that charitable subscriptions are going to fall off heavily. Payments to medical practitioners will need to be made where now their services are paid for by private fees.

Moreover at the end of six months, when sickness benefit falls due, there will be a great transfer of insured cases from the Poor Law to sanatorium benefit.

It is thus necessary to consider carefully under what conditions sanatorium benefit is conferred. By Section 16 of the National Insurance Act Insurance Committees shall make arrangements, to the satisfaction of the Insurance Commissioners, (*a*) with a view to providing treatment for insured persons suffering from tuberculosis . . . in sanatoriums and other institutions, etc.; (*b*) with a view to providing treatment for such persons otherwise than in sanatoriums, or other institutions, etc.

An insured person shall not be entitled to sanatorium benefit unless the Insurance Committee recommends the case for such benefit.

Although by Subsection (3) the Insurance Committee has some power to postpone the commencement of sanatorium benefit, it will, presumably, have very little power to discriminate between persons in conferring it, otherwise than as concerns their prospects of recovery.

By Section 17 (1) the Insurance Committee for any county or county borough may, if it thinks fit, extend sanatorium benefit to the dependants of insured persons, etc. With reference to this subsection it may be said that it will be very difficult to give sanatorium benefit to an insured person, and to refuse it to a dependant, especially where the question of institutional treatment arises, at all events for more than a limited period.

By Section 17 (2), if in any year the amount available for defraying the expenses of sanatorium benefit is insufficient to meet the estimated expenditure on sanatorium benefit for insured persons and such dependants, the Insurance Committee may, through the Insurance Commissioners, transmit to the Treasury and the council of the county or county borough an account showing the estimated expenditure for the purpose and the amount of the sums available for defraying the expenses of sanatorium benefit, and the Treasury and council may, if they think fit, sanction such expenditure.

By Section 17 (3) the Treasury and the council of the county or county borough sanctioning such expenditure as aforesaid shall thereupon each be liable to make good, in the case of the Treasury out of moneys provided by Parliament, and, in the case of the council of the county or county borough, out of the county fund or borough fund or borough rate, as the case may be, one half of any sums so sanctioned by them and expended by the Insurance Committee on sanatorium benefit for insured persons and their dependants in the course of the year in excess of the amount available for defraying the expenses of the Committee on sanatorium benefit.

It is to be observed that the local community will be called upon to defray much more than half the excess expenditure on tuberculosis, since they are to provide not only for the treatment of insured, but also of non-insured persons. There will not continue to be much option in the matter, since the candidate for municipal honours who declines to pay for sanatorium benefit will have to give his reasons. There is, perhaps, not the same security that the Treasury will continue to defray its half of the excess expenditure on insured persons.

The effect of this section, then, having regard to the previous considerations, is to place on the counties and county boroughs the duty of treating tuberculosis as the infectious disease which it is. The compulsion to do so may not be immediately felt, although, as regards Manchester, the pressure is even now very great, in spite of the large institutional treatment already accorded. But it will be felt very soon, and it may be hoped that local authorities will take up, resolutely and judiciously, the great work which Parliament has laid upon them. They cannot now do so with a full measure of success without being on cordial terms with those to whom the administration of the Insurance Act has been entrusted, whose co-operation will be indispensable.

DISCUSSION.

Dr. Marcus Paterson (Cardiff) declared that one of the first things he would like to see abolished was the word "consumption"; it came to have a stigma. A patient did not mind being called tuberculous, but he hated the word "consumption." There was a tendency to divide tuberculous patients into two classes—the class that would get well, and the class that would die. It would never do to divide them in this way in institutions. Imagine the feelings of a patient if he was drafted into a place from which no one came out alive! Dr. Paterson spoke of the difficulty of drawing a hard-and-fast line in defining an "early" case. Whether a case was an early one depended not so much on the physical signs in the lungs caused by the tubercle bacilli as on the patient's resistance to the toxins caused by the bacilli. He did not look upon the existence of cavities in the lung as being necessarily an evil so long as they were kept empty of caseating débris. He regarded the prevention of tuberculosis as a matter of looking after the growing crop. If the school children could be made and kept healthy, the problem was solved. Care of the children's teeth was most important in this connexion, as chronic indigestion was a fruitful cause of tuberculosis. The housing question was vital in any attack upon tuberculosis. The term "open-air school" might very well disappear. Schools should be properly ventilated and so constructed that it was impossible for the teachers to shut them up.

In regard to treatment of tuberculosis in children, Dr. Paterson remarked that there was a tendency not to take them into sanatoriums. He agreed that they should not be taken into sanatoriums for adults. If they were put with men the children were teased; if they were put with the women the nurses allowed the women to look after them. Children should be sent to sanatoriums for children only.

Dr. Paterson dealt, in conclusion, with the question of the infectivity of tuberculosis as regards those working in sanatoriums. If properly nursed there was no danger. In fourteen years he had never known a single worker in the wards to be infected. In his opinion, surgical tuberculosis was much more dangerous to the community than pulmonary tuberculosis, as the same precautions were not exercised in disinfecting tuberculous pus as in dealing with tuberculous sputum. He felt hopeful about preventive measures against tuberculosis. The most important problem was that of dealing with persons who had to earn their own living when their sputum was infectious. It was comparatively easy to prevent infection in patients' own homes, where sputum could easily be disinfected; but it was quite a different thing in public, where the exhibition of a pocket sputum flask was sufficient to empty a railway carriage, with the result that phthisical patients would not use those receptacles in public.

Dr. F. Rufenacht Walters (Crooksbury Sanatorium, Surrey) said: As all cases of pulmonary tuberculosis are now notifiable, every case in every stage should receive adequate and appropriate treatment. Originally, when sanatoriums were first started, only early cases with limited lesions and very little fever were supposed to be admitted to them, the rest being regarded as incurable, or, at all events, unsuitable for serious treatment. This conception of the functions of a sanatorium, however, has never been freely accepted in this country, and we should now frankly recognize the fact. Instead of adequate treatment for favourable cases and pessimistic temporizing for all the rest, we should set out with the intention of dealing thoroughly with every case in the interests of the patient and of the community. Medical science can do much more for the less favourable cases than was possible twenty years ago, and we have no right to shirk the difficult cases. There should always be two sections in every large sanatorium—a clinical section in which patients who are feverish can be properly nursed and treated, and an ambulant section for those who require graduated exercise and physical training generally.

Attached to the clinical section there should be a pavilion for the less hopeful and presumably incurable cases, whenever the sanatorium is within easy distance of the town or home. Otherwise this should take the form of a nursing home. The object of this is not merely to relieve suffering, but chiefly to prevent further infection at home. Attached to the ambulant section should be a farm colony and workshop, for graduated work. There should be adequate treatment and training for all.

This being accepted, the next point is to discuss the indications for treatment. Dr. Inman has divided cases of pulmonary tuberculosis into four divisions: (*a*) The febrile at rest; (*b*) the afebrile at rest, ambulant febrile; (*c*) ambulant afebrile, febrile at work; (*d*) afebrile even at work. It is, however, unsafe to classify by temperature alone;

pulse-rate and nutrition should also be taken into account. With this modification the indications would be as follows: All those who are febrile when at rest, or in whom there are complications, or a pulse-rate over 90, or extreme malnutrition (say weight more than 10 kilograms below standard or diminishing week by week), require nursing sanatorium conditions. Those who can take exercise without becoming feverish, and without raising the pulse-rate to over 90, and whose nutrition is reasonably good, will require treatment at a dispensary, or in the ambulant section of a sanatorium, or merely suitable quarters in a health camp, or reformed home conditions, according to circumstances.

Examination of the chest will give valuable indications for treatment; but, taken alone, these may be very misleading. Extensive disease with cavitation is not necessarily an indication for rest or a contraindication against hard work; whereas scarcely recognizable lesions with marked fever or much-raised pulse-rate call for careful treatment at rest. As a rule, when there are numerous fine râles or evidence of commencing softening rest is essential. Slight blood-spitting is not necessarily an indication for rest; but recent copious haemoptysis calls for recumbency and care.

3. Cases which can be profitably treated at a dispensary are those whose home conditions either are satisfactory or can be made so; who are free from fever or can be made so by a short course of treatment; who have a pulse-rate below 90; who are not emaciated or who are gaining weight; who are not subject to marked haemoptysis and have not recent softening. Those with marked laryngeal disease require vocal rest, which is more easily obtained in a sanatorium than with dispensary or home treatment. Slight cases awaiting admission to a sanatorium may be treated at a dispensary; graver cases should be treated at home until they can be admitted to the sanatorium, and not be compelled to attend the dispensary in person. When the only indication of tuberculosis is a tuberculin reaction, active treatment is unnecessary; but the home conditions and those of employment should be investigated. Those with definite lesions or symptoms of pulmonary tuberculosis who react freely after tuberculin or other vaccine should be kept at rest for a day or two after each dose, and are therefore better treated in a sanatorium.

4. In order to recognize the existence of slight fever the time of day and the method of taking temperatures are of importance. Most cases of pulmonary tuberculosis are especially feverish sometime between 3 and 8 p.m.; some are only feverish between these hours. In a small proportion of cases the temperature curve is inverse, being higher in the morning than in the afternoon or evening, but this is exceptional. It is not unusual to find a normal or subnormal temperature in the morning and well-marked fever in the late afternoon; so that the best time would usually be after tea-time. To be sure of one's ground, however, the temperature must also be taken early in the day, in order to detect an inverse temperature, and because a temperature of 98.8°, for example, may indicate fever (and therefore the need for rest) if recorded before breakfast time, it would not indicate fever in the afternoon. Then as to method: Axillary and urine temperatures may be disregarded owing to their unreliability. The choice lies between mouth and rectal temperatures. The latter has the advantage for accuracy and speediness. Taking accurate temperatures in the mouth, in any room or place which is not overheated, requires at least a quarter of an hour. Air entering the mouth, or cool air playing on to the cheeks, lowers the temperature of the mouth cavity, so that in order to recognize slight degrees of fever (which are of importance in pulmonary tuberculosis) the mouth must be kept shut with the thermometer *in situ* for twenty minutes and the face protected. An accurate rectal temperature can be taken in five minutes, but necessitates a dressing box for each case. A true rest temperature cannot usually be taken in a dispensary, as it necessitates an hour's recumbency. Consequently examination in a dispensary cannot be very complete or accurate. A temperature of, say, 99.6°, taken immediately after exercise, does not necessarily indicate fever, but a temperature of 99.6°, taken after an hour's rest, is slightly febrile.

5. Every case, without exception, should receive an educational course of treatment (that is, a month or six weeks) in a sanatorium as soon as possible after discovery of the disease, to be followed before the patient returns home by educational domestic hygienic training at home. The latter, though most important, cannot often replace the former, but the two educational courses should be co-ordinated and given by instructors familiar with both. The chief arguments in favour of giving the sanatorium course first are that the training and régime are continuous, instead of being limited to a short time daily; the conditions allow of more thorough training than at home, so that the one serves as an object lesson for the other; moreover, the doctor can make a more complete examination of the case than is possible for a dispensary officer, and can more easily inaugurate tuberculin or other special treatment.

6. Cases requiring prolonged treatment in a sanatorium or health colony are: (*a*) Those in whom there is marked debility or loss of flesh or a much raised pulse-rate. Such cases require rest and feeding up, followed by physical training. (*b*) Relapsing cases. (*c*) Those who become feverish on walking about. (*d*) Febrile cases with extensive lesions.

7. Having regard to the frequency of relapse when patients return to faulty home conditions, definite provision should be made for suitably housing and feeding convalescents returning to work. There are usually fairly definite reasons for the relapse: Either unsuitable diet, dirty quarters, lack of open windows, overcrowding, unsuitable employment, or in a vast number of cases incomplete recovery through insufficient time given for treatment. Whenever a patient leaves a sanatorium, possible causes of relapse should be reviewed and as far as possible corrected; and in many cases the best preventive will be a health camp, in which the patient can be housed and fed under proper conditions out of working hours. Tuberculosis is caused quite as much by non-specific as by specific causes; rational treatment should be directed against both.

Dr. F. E. WYNNE (M.O.H., Wigan) said: For the councils of county boroughs this question is very largely a matter of finance. These councils are composed of men quite as humane and not less intelligent than the average. They are elected to serve the interests of a certain section of the rate-paying community. Their constituents are people who will not believe that anything can serve their interests which involves an additional cost to the rates, and the councillor always has his eye on November 1st until he achieves the dignity of the aldermanic bench. There is not an election address issued in the kingdom that does not contain the blessed words "efficiency with economy." Now we here may be convinced that the expenditure of money on the prevention of tuberculosis is going to promote this ideal, but can we induce the councillor who has not our knowledge to make the effort of imagination necessary to realize it, and can we expect him to educate a majority of his constituents to the same level of political sagacity?

It is, at all events, our duty as medical officers to attempt this feat, because there is not the least doubt that, unless the views of our legislators can be altered, adequate administration of sanatorium benefit under the National Insurance Act will involve a considerable burden on local rates, and, as I think, an unfair one. I say an unfair one for the following reasons:

Insured persons can only be adequately protected from tuberculous infection by the elimination of tuberculosis from the whole community. To deal with tuberculosis among the insured alone would be as profitable a task as digging up dandelions in a lawn surrounded by uncultivated fields.

The Interim Report of the Departmental Committee properly and fully recognizes this fact, and lays it down as an essential of any scheme that it must provide for the whole of the tuberculous population.

For these purposes there is a capital sum available of one and a half million and a revenue for maintenance and administration amounting to 1s. 3d. per head of the insured population.

The suggestions of the Interim Report of the Departmental Committee are, that the available capital should be distributed to local Insurance Committees on the basis of providing four-fifths of the capital cost of the establishment

of tuberculosis dispensaries, three-fifths of the capital cost of establishing and equipping sanatoriums, and grants of an amount not specified in aid of the capital cost of altering or adapting existing hospital accommodation.

Now let us take the case of a county borough, having a population of 100,000, which will be expected to provide these things, and from whom the Insurance Committee will but hire them. As near as we can estimate, such a population will contain some 600 tuberculous persons, for all of whom, whether insured or otherwise, sanatorium benefit must eventually be provided. The income available for the administration of this benefit will be some £2,000.

The Departmental Committee estimate that a dispensary should be provided for populations of from 150,000 to 200,000, so that the county borough would have to find at least half the expenses of the dispensary, even if it had a population outside its area equal to its own and ready to co-operate with it. It would have to maintain, according to the estimate of the Departmental Committee, at least twenty beds in curative sanatoriums and local hospitals. In addition to these items, there are payments to medical men for domiciliary treatment. For all this expenditure the local authority will be only partially recouped by the funds in the hands of the Insurance Committee.

Now, what is going to be the amount of this expenditure when the recommendations of the Departmental Committee and the recently formulated demands of the Representative Body of this Association have been fulfilled?

The following estimates are necessarily very rough, but I think this meeting will agree that they are minimal. I have certainly understated the amount of fees payable to medical men for domiciliary treatment, as I have based them on an average of one attendance only per month per insured person, and I have included no payment for the medical officer of health who will have to inaugurate and administer the scheme, because my experience is that every new Act and every new order of a Government Department is piled upon his aching shoulders without any augmentation of his princely salary.

We have, then, the following items of expenditure:

	£
Half the salaries of the tuberculosis officer and his assistant	400
Six medical men working two hours per week at the dispensary	390
Two nurses at £80	160
Clerk dispenser	100
Rents, rates, etc.	100
Drugs, etc., including tuberculin and laboratory requisites	100
Printing, stationery, cleaning, etc.	50

In addition to these sums we have the maintenance of twenty beds, which, taking the figure of £75 per bed per annum, amounts to £1,500, giving a grand total of £4,240.

The maximum contribution available from insurance funds is £2,000, leaving a deficit to be made up from the rates of £2,240. To this we must add interest on capital, depreciation, and various contingent expenses, which will probably bring the amount to be provided out of the rates to at least £3,000 a year—equal in most cases to a rate of 2½d.

Now, I believe that a rate of 1s. in the £ would be well and economically spent if it got rid of tuberculosis, notwithstanding Sir James Barr's declaration the other night that the tubercle bacillus was the national bulwark against imbecility and physical degeneracy, but knowing what I do of the financial condition of many of our county boroughs, and of the view taken on the subject of economy by the average borough councillor, which if short-sighted is natural and inevitable, I have grave fears that our councils will refuse to burden their rates to this extent, and that schemes will accordingly be scamped and inefficient, and the money spent on them accordingly to a large extent wasted.

The prevention of tuberculosis is a national concern, and therefore the expense involved should be met to a greater extent than it will be under this Act by subventions from the national exchequer.

Dr. S. J. C. Holden (St. Helens) said: Much has been said of the machinery for working the tripartite scheme for the prevention of tuberculosis, especially in the matter of buildings, equipment, staff, etc., but little has been said of the patients to be treated under such schemes. The patient is the most important factor, and unless he becomes, or is made, amenable to treatment, the whole scheme fails. How, to some extent, he may be made amenable to treatment, is the object of my paper. I have called the anti-tuberculosis scheme tripartite, in contrast to the dual designation of the Interim Report of the Departmental Committee on Tuberculosis, in order the more easily to divide into classes the types of patients I wish to discuss. Here I may mention the main class under discussion is that of workmen, or breadwinners, who in many cases will be insured persons under the National Insurance Act.

The first class comprises those patients who are early cases, accommodated as far as possible in reparative sanatoriums. These patients must enter such sanatoriums with the knowledge that if they are married men their wives and children will not suffer from want during their absence, which, in most cases, will be prolonged. To a certain extent this is provided for in the National Insurance Act under sickness benefit, but I fear large numbers of these patients will not obtain this benefit owing to irregularity of contribution or non-acceptance by an approved society. The method of deposit contribution would be useless to them, because the relief obtained would last a very short time. Unless monetary provision is made for dependants, many patients will not remain, and therefore pass out to become probably open or advanced cases.

Again, it has often been remarked that excessive comfort accompanied by good feeding, provided in the modern sanatorium, renders the patient in many cases "work-shy." This may to some extent be guarded against by retaining the good feeding, but constructing the sanatorium buildings on the simplest and cheapest plan compatible with efficiency, so that the patient shall not return to his own home in a state of dissatisfaction and unemployable. Also schemes of graduated labour may be looked at from two points of view, either as a means of preventing the patient from becoming "work-shy," and of overcoming self-introspection so common in the idle, or as a method of auto-inoculation, as advocated by Dr. Marcus Paterson. I would advocate that such schemes be confined not merely to agriculture, but that schemes be formulated for utilizing some of the trades of the different inmates. There must at all times be admitted, for example, joiners, painters, tailors, cobblers, etc. Why should these people not be allowed to work on a graduated scale at their own trades, such work to be paid for at rates to be fixed, and the money distributed for the upkeep of the family? The results of their labours would help considerably in the upkeep of the institutions, and enable the patient on his discharge to return to full work without much fear of his breaking down again.

The second class of patients will be those who are able to live at home and continue in their ordinary employment, or, perhaps, in a lighter branch of employment. These will be cared for and treated at the tuberculosis centre, and the class of labour suitable for them defined by the tuberculosis officer. In this class the problem arises, How is change of employment to be provided? This applies to two types of patient. First, the patient who is discharged from the reparative sanatorium and is unable to resume his former occupation because it is too arduous, but can perform a lighter task and remain in good health; secondly, the patient under treatment at the tuberculosis centre, whom the tuberculosis officer decides must change his ordinary occupation for a lighter one if his treatment is to be successful.

I would suggest that there be co-operation between employers of labour, organized charities, and the public health authority of the area for the provision of a selected labour bureau, which could be worked as a branch of the Labour Exchange. Probably an after-care association, as suggested in the Interim Report of the Tuberculosis Committee, would undertake this duty. This bureau could keep a list of occupations found suitable by the tuberculosis officer, and in which vacant situations occur. The tuberculosis officer would decide on the patient fit to fill

the situation, The public health authority would be able to provide many of these situations, mostly of an open-air character, such as assistants in parks, either as park-keepers or gardeners, tram conductors, or in the scavenging department.

In passing, I consider medical officers of health who have been fortunate enough to be appointed medical advisers to local Insurance Committees should always be urging their local committees to take the broadest view of their duties in disbursing the funds at their disposal, especially for the benefit of dependants and, perhaps, in assisting the phthisical patient in obtaining a living wage.

The third and last class comprises those patients whose infectious condition necessitates their isolation in a suitable hospital. If eradication of tuberculosis is to be a success, this last class is the one to be treated most drastically. These are the patients responsible chiefly for the development of tuberculosis in contacts, and I would strongly advocate all interested in the preventive side of the work to follow the lead of my own town, St. Helens, and obtain powers of compulsory isolation. In the St. Helens Corporation Act, 1911, these powers were obtained, and I will endeavour to describe them briefly. If the medical officer is satisfied that a case suffering from pulmonary tuberculosis is in an infectious state, and living under conditions which preclude proper precautions being taken to prevent the spread of infection, he may make application to a court of summary jurisdiction. Such court, upon oral proof, may order the removal of such patient either to a suitable hospital, or if a parochial case to the Poor Law infirmary, three days' notice being given to the patient of this intention. The Corporation may in their discretion make good any financial loss falling upon relatives or dependants of such person. The patient may apply for a rescission order after six weeks' detention. This class of patient would probably never obtain sickness benefit. They are less likely to be admitted into approved societies than the first class, and the prospect of receiving permanent invalidity benefit in their cases, in my opinion, is a product of the imagination. Such cases as these are adequately provided for financially by our local Act.

Dr. W. M. CROFTON (Dublin) laid stress on the importance of house disinfection, which he did not think was fully appreciated by general practitioners. In his opinion, children often got infected by sleeping in rooms where other children had been ill of or died from phthisis. According to Vienna figures, 94 per cent. of children of 14 years were infected with the disease, but only 14 per cent. of those developed it. Therefore, if one could make the 14 per cent. like the 80 per cent., the problem was solved. He believed this could be effected by preventive inoculation with tuberculin. Under ideal conditions, all children should be inoculated, but at any rate all children of tuberculous parents and members of families in which tuberculosis had occurred should be inoculated. Treatment of those who developed the disease could be divided under three headings: (1) Sanatorium treatment; (2) tuberculin; (3) drugs. (1) As to sanatorium treatment: This was, in his opinion, practically useless. Out of 160 cases at Newcastle Sanatorium, co. Wicklow, supposed to be curable, only 14 apparent cures were turned out, the rest having been discharged still excreting tubercle bacilli; 70 per cent. who were discharged "much improved" went back to their homes to infect other people. (2) Treatment by tuberculin: Dr. Dunne, who had great skill and immense experience at the South Dublin Union, got 40 per cent. of improvements, which was a very good result; but the fact that 60 per cent. were not improved showed that tuberculin treatment was inadequate. (3) Drug treatment: In his opinion treatment by creosote in some hands produced far better results than sanatorium treatment. The most satisfactory drugs, he found, were sulphides or iodides in organic combination, and in his hands the best results occurred with intravenous injections of iodoform dissolved in ether, with a little liquid paraffin added. In very early cases he gave tuberculin as well as iodoform injections, and he believed that by this combined treatment all the curable cases mentioned above could have been turned out apparently cured, after which they should be sent to convalescent homes to get physically fit. That was the proper function of the present sanatoriums, in his opinion, and all active cases should be treated in hospital.

Dr. R. R. RENTOUL (Liverpool) remarked on the difficulty of dealing with tuberculosis when it was recognized that 20 to 40 per cent. of the cases were undiagnosed. As to the injection of tuberculin, he thought it was not yet proved that it might not have some deleterious effect on other parts of the body which were not tuberculous. Municipal fever hospitals had done so little good that he thought the public would be chary of spending so much money on consumption sanatoriums. It was a pity they could not follow the example of the Board of Agriculture in dealing with swine fever—put an end to the consumptive patient and give compensation to his relatives. If general practitioners could increase their knowledge of the disease it would do far more good than multiplying sanatoriums.

Dr. LLEWELLYN HEATH (Ipswich) thought there was a tendency on the part of the public to allow sanatoriums to dominate their thoughts. Many of the schemes presented to the Local Government Board during the last few months made little or no mention of any care for tuberculous children, which he considered was a serious omission. From the point of view of preventive medicine, their work in regard to the tuberculosis problem consisted of: (1) Dealing with the pre-tuberculous child, when conditions of health and environment were such as to predispose to tuberculous infection; (2) dealing with infected individuals who had reached a condition which rendered them a potential danger to the community. There were very few sanatoriums at the present day for children under the age of 15 suffering from pulmonary tuberculosis. The general excuse was that their admission would mean a tremendous increase in the cost of administration; but even granting this, the best time for such expenditure was at the beginning of life, when there was a chance of getting a good return for the money spent. With regard to surgical tuberculosis in children, the public health service had so far left this severely alone. Provision in England in this respect was lamentably inadequate, both in regard to preventive measures and curative provision. This policy of delay was taxing the hospital accommodation of the country to a serious extent, chiefly on account of the length of time such cases required for their treatment. The work at Sir W. Treloar's homes at Alton illustrated the splendid work that could be done, and the provision, by the joint efforts of public health and education committees, of hospital schools and open-air schools upon these lines would meet a great need. He was extremely pleased that Dr. McVail had referred, though briefly, to the question of the milk supply. That milk from tuberculous cattle was a potential danger would be agreed by all, and present legislation, which practically limited its scope to udder infection, was largely futile, for two reasons: First, because with one exception, the udder was the organ in the cow the least frequently affected with tubercle, and secondly, it was definitely proved that milk from cows suffering from tuberculosis elsewhere than in the udder might contain tubercle bacilli. In addition to this there was the fact that although heating destroyed tubercle bacilli in milk, yet the toxins remained, and Calmette claimed that the use of milk from a tuberculous cow, when it had been heated, acted more or less as a dose of tuberculin, though in unmeasured quantity. Unless the "healthy milk" part of the problem was more vigorously tackled than it had been in the past, they would be neglecting one of the most important measures in their hands.

Dr. BROWN (Bacup) said that they had raised the power of resistance in the great masses of the population in Lancashire, and they wanted to deal with the problem of resistance. He would like the Government to give him 5s. a week for each of his tuberculous patients, to send them to a "sanatorium house" at the sea. He thought it was better to treat patients in their own homes rather than to send them to sanatoriums.

Dr. J. BRASSEY BRIERLEY (Manchester) thought the money should be spent in making every house a sanatorium. There was always some disease cropping up

where there was a family. When a patient went to a sanatorium he put on flesh and did no work, and a man fed up in idleness would not get well. Patients were sent back from sanatoriums to the rooms in which they had lived before they went there, where they found a starving family and insufficient food. In his opinion this was beginning at the wrong end; money should be found to feed poor people and to improve their homes.

Dr. TAYLOR (Salford) wished to know what were the indications for treating one patient at home and another at a sanatorium.

Dr. STEWART (Queensland) thought Dr. Crofton did not seem to realize that immunization with tuberculin was quite a different thing from the immunization of tuberculosis.

Dr. E. SERGEANT (Co. M.O.H., Lancashire) said that he could not agree with the opinions expressed by so many speakers as to the inutility of isolation hospitals, and hence the probable uselessness of sanatoriums; and therefore he wished to enter a protest against such opinions. He had been receiving money from the public for forty years for the institutional treatment of infectious diseases, and his experience had been that the mortality of patients treated in hospital was far less than that of those treated at home. Another point was that in districts protected by isolation hospitals the amount of disease was less than in unprotected districts, and he thought good had been done in modifying the influence of scarlet fever and other infectious diseases. With regard to phthisis, sanitation had been in various ways preventing this disease. Measures had been taken for improving the homes of the people. It was most important to ensure an absolutely clean and pure milk supply, and there should be systematic examination of all cows in districts where phthisis prevailed.

Dr. A. G. GULLAN (Liverpool) said he had seen good results from home treatment. This work could be carried out by general practitioners who had not been paid for it up to now, and had not had sufficient time to attend to the cases. They were quite able to deal with those patients who could be treated by them from the commencement of the disease, which he thought would be a great advantage.

Dr. H. COOPER PATTIN (Norwich) drew attention to the desirability of providing night shelters in dealing with tuberculosis. These were institutions provided by the local health authorities at which a tuberculous patient who could not have a separate suitable bedroom set apart at home could go and sleep under hygienic conditions. Such shelters were being set up in Canada, and in submitting a scheme for dealing with tuberculosis in his district he had recommended and certainly hoped ultimately to obtain one. Their use in the case of workers, especially single workers, was obvious. They would provide a comparatively cheap and most efficacious adjunct to dispensary and sanatorium treatment.

Dr. CHALMERS (President of the Section), in closing the discussion, referred to the importance of the phrasing adopted in the Insurance Act. "Consumption" had been replaced by "tuberculosis," and the practical result would be that, while sanatorium benefit for insured persons would be available chiefly for phthisis, directly sanatorium benefit was extended to the families of insured persons, as might be done on the initiation of a local Insurance Committee, phthisis would be largely replaced by the other forms of tuberculosis. One very obvious advantage of this extension would be that public health administration and the Insurance Commissioners would have common ground in dealing with the tuberculous children to whom Dr. Paterson had referred. Their work would in this sense become more effectively preventive than when directed only to the treatment of those in whom pulmonary symptoms had already developed. In another sense the co-ordination of work was desirable, because, probably for the first time in their history, the aims of public health administration were being assisted by a grant in aid.

THE EFFECTS OF INTRA-MIGRATION ON NATIONAL HEALTH.

By J. STEWART MACKINTOSH, M.D.Durh., M.R.C.S., L.R.C.P.

BY "intra-migration" I mean the uprooting and resettlement within the confines of the British Isles of groups of inhabitants who, until the time of emigration, had been settled for many generations in one district or particular environment. The chief trend of these movements of the population has, of course, been towards urban immigration, but there is also a good deal of drifting of families and individuals up and down the country. It is my purpose to record the result of observation of some of those movements and to suggest that they afford a solution of certain problems of national health hitherto somewhat puzzling, and to urge that national degeneration is not wholly due to permitting the alleged "unfit" to multiply, but that other factors are at work which have not received due recognition.

Attention has been drawn in a recent number of the BRITISH MEDICAL JOURNAL to the condition of the small and isolated community inhabiting the island of St. Kilda far out in the Atlantic. It was remarked among other things that though mental intelligence was not high the health of the community was excellent in spite of long isolation, and that in spite of many generations of close inbreeding there was no sign of real degeneration visible. This is probably to be explained by their having migrated from neighbouring islands of the Hebrides and so being already adapted to the climate and social conditions obtaining in St. Kilda, and in having, by reason of their long isolation, effected practically complete elimination of unsuitable types.

Physical degeneration occurs in small communities when they are infiltrated with germ-plasm of damaged quality, or when, having migrated, the environment they have quitted differs materially from that in which they have settled. It is not generally realized that in the days before we changed from being a people mainly pastoral and agricultural to a people mainly industrial—before the rapid, cheap, and multiple means of transit we enjoy at the present day—our rural population consisted largely of small and practically isolated communities, closely inbred, closely specialized for local climatic and social conditions, and therefore resembling the present community of St. Kilda in general characteristics. There can be no doubt that, apart from recurrent visitations of war, famine, and pestilence, our peasantry enjoyed good health, and were on the whole a sturdy virile race. They lived on the soil and on the products of the soil which bred them. Imported and manufactured foodstuffs were practically unknown till recently, for, although such foreign sources of nutriment as the potato began to be known in Tudor times, "imported foodstuffs" has a very different meaning to-day.

The population of the British Isles does not, of course, present anything approaching to uniformity of type, consisting as it does of a small dark race to all intents and purposes aboriginal, which was subsequently infiltrated by successive waves of invading races, mostly blonde in colouring, and differing in physical and mental characteristics. I have endeavoured to show elsewhere that the purer types of these intrusive races found in this country still require an environment approximating to that in which their race evolved; and in the case of blondes a dry soil, low rainfall, open-air life, and dry frosty winter are still necessary for the maintenance of vigorous stocks and for the avoidance of somatic degeneration, these being the conditions obtaining in the Baltic regions in which the blonde Nordic race evolved.

My concern in this paper is, however, not so much with the original elements contributing to the nation as it now stands, as with the various communities undergoing, century after century, evolution in and adaptation to local conditions after the period of large invasions came to an end. In these communities the intrusive element is sometimes preponderant, sometimes the aboriginal, and sometimes it is difficult to say which is in the ascendant, a hybrid showing the mingled elements of aboriginal and intrusive race having established itself. Clear instances of this are to be found, for example, in Ireland, where a common type

has dark hair with white skin and blue or blue-grey eyes. In short, the settling down of the nation to pastoral and agricultural pursuits, after the great invasions ceased with the Norman Conquest, was followed by a steady process of natural selection and specialization for local conditions till after the middle of the nineteenth century, and when such anthropologists as Beddoe, Ripley, and others began to examine the population of the British Isles they were able to indicate a large number of distinctive types recognizable at sight to the trained, or even to the untrained, eye.

I wish to lay particular stress on this local specialization, because I purpose showing that when it is followed by disintegration and migration there is great danger of degeneration of rural-bred stocks if the new environment differs materially from the old. This specialization is most noticeable in the peasant class, but is not peculiar to them, being at times distinctly traceable in the yeomanry, and even occasionally in the upper classes. In contrast with these individuals and stocks of strictly limited adaptabilities there exist elements in the nation of varying aptitudes in the matter of acclimatization—people, one may say, whose cellular structure is readily modified in response to the stimulus of changed surroundings. It is a matter difficult to prove by sheer statistics, but observation suggests that readiness of adaptation to change argues an ancestry derived from many and varied stocks, such as are usually brought together by urban influences.

I will now pass on from abstract considerations to some concrete instances of the effect of migration on localized stocks. My sphere of observation has been mostly situated in the north-west district of London—rising ground with a subsoil of clay, capped at its highest part by a layer of Bagshot sand. The air is bracing and fairly pure, being exposed to the prevalent west and south-west winds blowing up from the Chiltern Hills and country to the south of them. The district has a reputation for being very healthy, but the cold clay subsoil and exposed position appear to favour catarrhs, respiratory troubles, rheumatism, etc., in those predisposed to them, and this is specially noticeable between Christmas and Easter. Being a high-class residential district domestic servants are attracted thither from various parts of the country, and have afforded an excellent field of observation, for they are largely recruited from the specialized communities I have been describing.

Time for this paper being limited, I cannot give a detailed account of the health of all rural types coming to reside in North-West London. For the purpose of illustration, I will select those who have left their native villages in the county of Sussex to take service in Hampstead. Sussex is reputed in the textbooks to be a typical Saxon shire, the original Britons being supposed to have been driven westwards or exterminated by the invaders; but the textbooks are wrong—the anthropology of Sussex is not so simple.

Apart from hybrids from the towns and casual settlers in the country, there are two distinctive Sussex types who present a strong contrast to each other.

Some years ago a lady asked me to examine and treat one of her maids. At the hour appointed I found two girls in my consulting room. On my inquiring which was the patient, one of them, a short, thick-set brunette, indicated her companion, adding, with a laugh, "I don't trouble the doctors much."

The sick girl was of a very different appearance to her fellow servant. Tall and rather slender, with fair hair, blue eyes, white skin, and regular features, she would have served as a typical "English" girl in the original sense of the word. Her complaint was of pains about the face and head, cold hands and feet, digestive discomforts, anaemia—a general sense of misery. These troubles had come upon her since she entered service in London seven months previously, and they were getting worse. She was quite young, and this was her first place, but it was comfortable, her mistress was kind, and she was not homesick. Several weeks before, however, she had gone home for a few days, and by the end of her stay all her symptoms seemed to disappear, but on returning to Hampstead they had come back as bad as ever. She had come to London from a village in the South Downs, not far from the sea. She was one of a large family, but she was the only one away from home. Her parents and brothers and sisters were all living and all strong and healthy.

In course of conversation her little dark-eyed companion, who was cook in the same house, remarked that she also came from Sussex, mentioning a town in the Weald, and adding, with a touch of the friendly contempt the robust are apt to show towards the ailing, that she had been in London over two years, but that the doctors made nothing out of her. Her reiterated and emphatic assertion, coupled with the very marked physical contrast she presented to the girl from the Downs, arrested my attention. The question occurred to me whether it was simple coincidence or whether these two girls represented types respectively adaptable and inadaptable to the environment into which they had migrated; for it must be remembered that the patient maintained that she enjoyed good health until she came to London, that she regained it when she went home, that she came of apparently sound stock, and there was no obvious cause—such as carious teeth, constipation, or a hard situation, to account for her troubles.

However, in the course of several years' practice in North-West London subsequent to the interview just described, I have encountered a number of immigrants from Sussex, and those from the Weald have approximated to this same short, thick-set brunette type whenever they have come of old-established peasant or yeoman stock. Those, on the other hand, bred on the coastal strip which comprises the well-known chalky South Downs are generally fairer in colouring, of a taller, slenderer build, and evidently represent a population strongly infused with the intrusive blonde race. This blonde settlement began probably long before the historic Saxon invasion, for Julius Caesar reported that when he landed in Britain he found Belgae (that is, the blonde race of North Europe) on the coast and the Silures inland, a state of affairs still persisting, apart from the mushroom towns of the Sussex coast.

In the course of two thousand years there has been time for much selective evolution in this coastal population, resulting in the specialization I described at the beginning of this paper, and this holds good but in an intenser degree for the brunette inhabitants of the Weald, for these probably represent a race which has bred *in situ* at least since early neolithic days. The wide stretch of the Weald was little better than a trackless quagmire until quite recent times. It was, therefore, not only difficult for its inhabitants to shift from place to place or for migrants to enter from neighbouring counties, but it also cuts off free access to the coastal strip except by way of the sea. Until, therefore, the county was "opened up" by improved roads, and the advent of the railway encouraged the development of the great coast towns, the population had bred undisturbed through long centuries, and the county may therefore be taken as one highly productive of those specialized types described at the beginning of my paper. My personal observation of these migrants from Sussex, made mostly on domestic servants, but also on men and women in various occupations, has shown me that they tend to polarize round the types represented by the two maids I described just now, and that the short brunette type from the Weald finds that North-West London "suits" her, to use the common expression, while the fairer type from the coast finds it does not, showing a proclivity to catarrhs, rheumatism, neuralgia, anaemia, etc.

I have no doubt whatever that the explanation of the brunette type's freedom from such ailments lies in the fact that she is migrating from the Wealden clay to the London clay, and that the exigencies of domestic service, the somewhat close confinement to the house, etc., are more in accordance with her home habits, whereas the blonder coastal type, having a strong infusion of the intrusive fair race and coming from a highly permeable soil, finds herself in an environment differing materially from that in which her stock has undergone evolution during a number of centuries, particularly in respect of humidity of soil and confinement to the house. I mention this last factor because these girls always fare better as children's nurses with the daily promenade than as house servants, cooks, etc.

Be it noted that this ability to adapt is not a question of the relative soundness of the original stocks. These Wealden types are just as liable as the others to suffer in health if their surroundings do not suit them. One of

them, a cook, told me that when she was 15 her people left their village to take a boarding house for summer visitors in Hayling Island, near Portsmouth, a flat, sandy, treeless expanse surrounded by tidal waters. For the six years she went there she was in constant ill health with anaemia, neuralgia, and indigestion, but on leaving the island to enter service in Hampstead she quickly recovered her health. I have met with many other similar items of evidence that there exists in this country a large number of individuals or stocks who are restricted to a narrow environment if they wish to maintain their health, and tend to degenerate when they migrate. I could, had I time, cite instance after instance of individuals bred on clay finding their health fail on sand or chalk; of east coasters finding the west or south "does not suit them," and so forth. The major issues of Europeans in the tropics, of black races in temperate or cold climates, are patent enough as regards the effect of change of latitude on health, but there are subtler processes at work just as certain in their ultimate results, though at present unrecognized as factors in national health, because they are gentler and less dramatic in their manifestations.

Of course, there is such a thing as acclimatization; it is observable in many of the domestic servants who have formed the main field of my observation. There is the response of the tissues, including the brain with its highest centres, which enables the individual to effect a measure of adaptation to new surroundings, so that many adults enter a period of apparent health after preliminary disturbances brought about by the change. Also many better-class domestics are averse from complaining of any ill health which may be troubling them unless they absolutely break down. But all this only serves the better to mask the ultimate result. If, when marriage takes place and children appear, the immature organism finds itself affected by conditions differing from those in which its ancestry evolved, it is unable to achieve the same measure of acclimatization as the adult. It is notorious, for instance, that European children have to be sent home from tropical countries where their parents can, with reasonable care, maintain sufficient health to carry out their duties.

An analogous process can be observed in the offspring of types such as are represented by my two Sussex girls in respect of such children as "take after" their mothers. The children of the Wealden woman who has made her home on the London clay will probably thrive. Not so those of the girl from the chalk hills. The disharmony will probably first manifest itself in their mucous membranes. In early childhood they will be subject to catarrhs of the respiratory and digestive passages, the recurrent irritation of the former favouring the production of enlarged tonsils and adenoid growths with the train of serious and enduring ills that result from them. The imperfect assimilation of nourishment, the distortion of the frame, the mental hebetude, the ready fatigue of brain and muscle, etc., all tend to the production of a generation inferior at every point to the previous one bred in its proper environment, and in the third generation these evils are accentuated, and degeneration presaging extinction is in sight.

This result of migration is no figment of the imagination. I can state with assurance that it is readily discoverable to anyone who chooses to look for it, especally in the raw new suburbs pushing themselves out over the tracts of London clay that surround the metropolis. I have confined myself to the effects of transference from one county (divisible into two regions) to one district of London, but these effects are but a small part of a complex movement taking place all over the country, the essence of which is the disintegration of small communities of ancient growth, and the reassemblage of their elements under the aegis of modern Industrialism.

The study of provincial types and the factors which have gone to produce and differentiate them has been only tentatively pursued in this country. For a comprehensive and truly scientific treatment of the subject we must go to France.

M. E. Désmolins (the well-known author of *A quoi tient la supériorité des Anglo-Saxons*), in a work entitled *Les Français d'aujourd'hui*, has set forth the results of a thorough and intimate survey of the various provincial types of France. It is founded in part on the work of two earlier French sociologists, Frédéric le Play and Henri de Tourville, and represents the results of more than fifty years' patient and unremitting observation and research. M. Désmolins, in presenting his treatise, displays the brilliance for which French *savants* are famous in dealing with the complicated threads of his subject. The dexterity with which he contrasts the groups of geographical, geological, meteorological, botanical, zoological, social, and religious influences in various parts of France, and their effects in determining distinctive characteristics in the inhabitants of these regions commands the sincerest admiration.

In perusing his book one point in particular struck me—that the migrant in France frequently does not materially alter his method of earning a livelihood when he leaves his own district. Thus the Auvergnat in his natural home in the mountains of Central France is given to petty bargaining, not unmixed with sharp practice, *maquignonnage* as it is called, in the disposal of local stock or produce. When he migrates he becomes a hawker, pedlar, rag-and-bone merchant if poor, but may rise to dealing in second-hand clothing and other goods, or even become a wealthy purveyor of antiques; in short, he takes up any occupation giving scope for his inherited aptitudes. Not only so, but he keeps in touch year by year with his native soil, often returning each summer to work on the farm where he was born. I have seen excursion trains on the Orléans line discharging numbers of these returning emigrants at way-side stations in the Auvergne. There is a regular service to meet the demand at certain seasons of the year. For France there lies in such customs a great bulwark against national degeneration, and as Agriculture has not decayed as with us (although the ties that there connect peasant and yeoman with the soil that bred them have been stretched and not infrequently ruptured), the wholesale detachment which has taken place in this country and in Germany with the advance of Industrialism is a far greater menace to national stamina than anything obtaining in France.

Of course migration from one rural district to another of a materially different soil and climate (though liable to have an adverse effect on families of poor adaptive powers) is of small moment compared to the great central fact of Industrialism—urban immigration.

In recent years we have heard an outcry against the alleged "encouragement of the unfit to multiply." From certain quarters issue forth denunciations of measures directed to improve nurture while neglecting the far higher potence of Nature. The superior power of heredity over environment has been calculated with such nicety that it has been presented to us expressed in terms of decimals. But, apart from other objections, the application of such calculations to the determination of survival-values seems to assume that communities of human beings, such as the population of a large city, are of the same homogeneous character as a shoal of herrings or a flock of sheep. But in both the latter each individual has been evolved under precisely the same environmental influences as the rest of the flock or shoal—influences that will vary in the future as little as they have done in the past. On the other hand, the population of a great city is an assortment of more or less distinctive types or subtypes owing their variety to the selective influence of environments which differ from each other in material factors, seeing that the population of a city has not grown *in situ*, but is largely the result of immigration from various sources. Furthermore, the environment is undergoing unceasing and sometimes rapid change. The individuals, then, of an urban community cannot be classed as good, bad, or indifferent, according to some rigidly conceived standard of fitness or unfitness to survive and propagate. The price of our rapid transition from an agricultural to an industrial nation cannot yet be wholly estimated, for the whole account has not yet been rendered. But one result of this transition has been the disintegration of rural communities, their aggregation in new centres, and the extraction, by a severe process of natural selection, of types who could adapt themselves to industrial exigencies and the climatic and other accessory conditions therewith associated. My point now is that a large proportion of these immigrants, efficient enough in rural occupations, find themselves unsuitable for urban conditions, and therefore tend to somatic deterioration. But are they, then, to be classed as essen-

tially "degenerate" or "unfit"? Is the germ-plasm itself damaged? Is there no hope of regeneration? Are these failures of adaptation to be placed in the same category as the hereditarily insane, the essential epileptic, the deaf mute, the imbecile, the idiot, the moral pervert? In the West of Ireland is a fringe of terrible skin-and-bone country, mountain and moorland thickly strewn with the débris of crumbled summits by the ice that ploughed its way from peak to sea in a forgotten age. In other lands one would expect to find no more sign of habitation than an occasional lonesome farm or shepherd's hut, but here many a gaunt valley is filled with people. These are the notorious Congested Districts—groups of cabins clustering cheek-by-jowl or dotted haphazard over the countryside and inhabited by listless scarecrows clad in rags of rags. Here famine and pestilence hold perennial sway, and only those who have seen the full development of these plague spots in the remoter promontories and peninsulas of Connaught can believe that such places could exist within the confines of the British Isles. The forefathers of these derelicts were thriving peasants driven from their fertile native soil into these wildernesses by the storm and stress that swept over their land in past centuries, the innocent victims of "deeds done long ago, and ill done." One thing alone stirs their breasts with hope—the sound of the Atlantic tides that ebb and flow about their coasts. Beyond it are cousins, brothers, sons who have managed by hook or crook to cross the sea. And have these gone to swell the ranks of the inefficient in other communities? On the contrary, the New World has drawn some of its most hard-working labourers from these same limbos of despair—men who develop a surprising physique and energy as soon as they can enter environmental conditions at all conformable to their physical needs. Some come back to their relatives after a few years of exile, and relapse after a short time into the listless quasi-vagabondage from which they had made their escape.

Professor Karl Pearson tells us "that it is essentially the man who makes his environment, and not the environment which makes the man." I am with Professor Pearson in so far as I believe that this is the task man has undertaken, thereby differentiating himself from the rest of the animal kingdom. But surely it is the collective rather than the individual man who selects the environment. In the case of the working man, it is the leaders to whom he looks for guidance that are at fault. Man has not yet travelled far along the road whose end will not be reached till he has established absolute command over the forces of Nature, and migration or exile afford a ready test of the advance he has made. Indeed, the troubles unknown to the lower animals which beset man even in the most favourable circumstances show the instability of his present equilibrium and the recurrent need of adjusting his balance, although it is this ever-present need that spurs him forward.

Shall those, then, whose specialized talents are in demand for the nonce say to the rest: "Yours are the *bouches inutiles;* you must starve that we may carry the day!"? Is it anything but national improvidence to "scrap" material you cannot use at the moment? We have to breed for environments that undergo continual change. There is a terrible wastage going on of good stuff for the making of a nation through nothing but ignorance—not culpable, perhaps, but sheer ignorance all the same. We have chosen to make ourselves an industrial nation and let our agriculture decay; we have offered industrial work to those who made their living on the soil, luring them into the cities and into environments differing in many respects from those in which they were evolved. The congested districts in Ireland are patches of jetsam swept into the recesses of the land by the tidal waves of conquest and oppression; our city slums have accumulated through the agency of economic currents no less ruthless in their operation or deplorable in their results. There are, of course, a number of true degenerates in our midst. They have undoubtedly been allowed to multiply unduly. Certainly before the great uprootings of localized types occurred a necessary process of elimination of the "unfit" was persistently in operation. But it is wrong to ascribe the present state of affairs wholly to unwise interference with or suspension of natural selection, without distinguishing between the presumably true, germ-plasmic, degeneration of deaf-mutes, imbeciles, congenitally feeble-minded, etc., and those whose stock—good, maybe, in its natural environment—finds itself in disharmony with another. We cannot forthwith, especially amongst our working classes, evolve a type who feels himself, with the Rabbi Ben Ezra—

> Fearless and unperplexed,
> When I wage battle next,
> What weapons to select, what armour to indue.

That will not come till the day of the Superman; meanwhile every migration of man increases in some degree the stress of natural selection, makes increased demands on his adaptive powers.

However great the ingenuity at man's command, it often fails to compensate for an inadequate natural elasticity—to make up, for instance, for the lack of selective weeding in his ancestry by specific disease germs such as tubercle, to which he now finds himself exposed. This is the problem that confronts us. We, as a nation, are not in our origin homogeneous; the development, therefore, of the localized types, such as the Sussex examples I have described, may depend not merely upon seclusion and specialization, but also upon inherited aptitudes for this or that environment derived from other distinctive primary races that have gone in past times to make up the British people.

I have gone elsewhere into what these races are and how their respective evolutions affect the different types of the nation as we see them to-day. I wish now to emphasize that the nation, at present, is not a complete compound (in the chemical sense) of its primitive elements; it is largely an intimate mixture constantly forming, it is true, amalgams between one or more of its original component parts, but with a co-existing tendency to their segregating out as generation succeeds generation. Once this complex nature of the community is grasped, it will be apparent that we must be very chary of accepting mathematically calculated deductions as to the relative power of heredity and environment which do not take this complexity into account. In point of fact, a multitude of diseases arise from an inherited tendency manifesting itself in one environment and not in another, the two factors being, therefore, interdependent and inseparable. Prominent amongst such diseases are the various forms of tuberculosis. For instance, the cow is only subject to tubercle when it is shut up in a dark, ill-ventilated cowshed, it being naturally a wanderer in search of pasture. Similarly there are many human beings only subject to tubercle when living in unsuitable conditions. Tubercle is a common disease, and its mode of selection of its victims is often such as appeals powerfully to sentiment. But there are others just as fatal to the national physique, though more stealthy in action and less vivid in their immediate claim on public sympathy. Attempts have been made to correlate racial or physical types with tendency to this or that disease, such as the proclivity of blondes to rheumatism, heart disease, tonsillitis, and of brunettes to cancer, nervous diseases, phthisis; but, having established such correlations, we must advance further, and ascertain if possible why, or in what environments, these morbid proclivities are excited, and how they are modified by change of surroundings. In a paper read before the Hampstead Medical Society in November, 1910, published subsequently in the *Clinical Journal* of August 9th, 1911, I made certain suggestions and recorded certain observations in this connexion, but to arrive at any practical result extensive co-operative research is necessary; and I think that with the help of such a body as the Anthropometric Committee or through widespread individual enterprise statistics of the highest value to the health of the nation could be compiled.

Now, if the aim of eugenics be to improve the stamina of the race by restricting reproduction to "sound" stocks, can it not include in its aim the securing to such stocks the environment they severally require, or of discouraging migration into surroundings calculated to cause somatic as opposed to germ-plasmic degeneration? As a companion to the old saw, "One man's meat is another man's poison," it might well be said that one man's garden is another man's graveyard. Regarding the larger question of emigration beyond the seas, available information all

goes to confirm the truth of the principles I have laid down in this paper. In the *Eugenics Review* of January, 1911, is a paper by Major Woodruff, M.D., of the United States Army, entitled "The Eugenics of Migrants," in which I was interested to observe how closely, though quite independently, we had been working on parallel lines. He deals, of course, with European migrations to the American continent and tropics, and depicts very clearly how severely the stress of natural selection falls on the stream of emigrants from Europe representative of innumerable racial types or subtypes. He puts the case succinctly in saying that

> every character, such as colour and size, must be beneficial and of survival value. . . . Now it generally happens that a character which is of indispensable value in one environment may be so injurious in another that migrants promptly perish.

Of course there are varying degrees of stress, and, as Major Woodruff expresses it, the very slowness of change may allow "evolution of new varieties by survival of the variations fittest for the new environment."

All environments are naturally in a state of flux, and the organisms which they condition must be continually varying, generation by generation, to meet the change taking place, but these processes are commonly very gradual. The case is altered when migration takes place, and the greater the change the more immediate and dire is the effect on the migrating organism. Major Woodruff has been for years observing how this biological law has affected European colonization in America and the tropics,* and I, unaware till recently of his work, have been noting its operation in the shifting of population within the borders of the British Isles. Here the process is more subtle and less apparent to the casual eye, but that is all the difference. It is just as certain in its ultimate results if the stock cannot keep pace with the change by producing adaptable variations, or, in mixed strains, by producing a sufficiency of segregating adaptables, and any rapid change in the national pursuits must be followed by degenerative phenomena.

Can the study of adaptability in the individual help us in any way to solve our social problems? I think so. Man, as man, walks by knowledge rather than by instinct, and any addition to his knowledge should help him to increase the stability of his equilibrium. He is not bound, as the animals are, wholly to submit to change in the cosmic forces that impinge upon him. He can think, and from thinking act to survive. Pascal's famous saying,

> L'homme n'est qu'un roseau le plus faible de la nature, mais c'est un roseau pensant,

has lost nothing of its force and truth in the light of modern biology.

It is firmly established that blondes undergo inevitable somatic degeneration in cities. Then it is time to discourage their immigration. We cannot afford to lose them as a national asset. Their natural courage and energy they have inherited from their "Nordic" strain has contributed largely to the place we hold in the world. Let us pay more discerning and individual attention to the environment of children; it is they who are hardest hit by unsuitable conditions. Let us note how, following the centripetal force exerted by the city, a centrifugal movement is setting in, how the suburbs are attenuating, as successive rings and satellites form round the main orb along with increasing facilities of transit. Whither this movement is tending and what opportunities we are losing day by day the future will show, but some degree of intelligent anticipation is even now possible. Perhaps it may be to the ultimate advantage of the nation to pass through the ordeal of urban life and emerge by the centrifugal movement I mentioned just now with tissues better armed against disease; but the price to be paid for such a consummation is a terrible one. The time is possibly ripe for checking the reproduction of stocks whose germ-plasm is hopelessly bankrupt, but there are many more, apparently insolvent, who could with intelligent management be made to yield an increase, and how large is this class cannot be determined until the last word has been said on the peculiar relation of man to his environment.

My object has been to urge that although misdirected humanitarianism may favour the multiplication of the essentially degenerate, the chief cause of national deterioration is not to be found here, but in the operation of factors hitherto imperfectly recognized. We must realize that we have drifted into conditions which have upset not merely those whose foothold was already precarious, but also a large section whose stance was firm through many centuries of national life, who have greatly contributed to our former national character of solidity and strength. Nowadays we prize the samples of craftsmanship our grandparents consigned to the lumber-room. We search the waste heaps of abandoned mines for the rare and once unsuspected metals they may yield. Shall a future day find us raking over the débris of what once were virile stocks, to recover that which gave us our former pride of place, or which would meet our need in some new phase of national life?

Again a "great and exceeding bitter cry" has gone forth from Esau the man of the field, the "red" man who must live with the sunshine and the wind. The cry is as of old against Jacob, the sojourner in tents, the lover of the indoor life, the natural city-dweller of to-day. For once again Edom has been beguiled into yielding his birthright for the mess of pottage. Once more he has compromised himself by marrying the daughters of Heth, and our streets are filled with a horde of mixed origin who know no pride of race.

This will prove a stumbling-block for those who cry "Back to the land." Unless they exert the utmost care and discernment, unlooked-for troubles will arise and the reality prove other than they anticipated. To hope to recover the good old British stocks by indiscriminately planting out "on the land" the slum-denizens of our towns is as vain a quest as to turn barndoor fowls loose on the moors and expect them to breed grouse.

Before, then, any drastic measures are undertaken to remedy the state of affairs into which we have drifted, let us make sure that we have taken all our bearings, calculated all the impinging forces with which we may have to deal, remembering that now as heretofore

> Science moves but slowly, slowly
> Creeping on from point to point,

and that

> Knowledge comes, but wisdom lingers.

* See his books on *Tropical Light* and *Expansion of Races*, published by Rebman and Co.

SECTION OF ELECTRO-THERAPEUTICS AND RADIOLOGY.

Charles Thurstan Holland, M.R.C.S., President.

PRESIDENT'S INTRODUCTORY REMARKS.

In a few sentences the President outlined the business of the Section, welcomed the members on behalf of the Liverpool radiologists, extending a special welcome to their distinguished visitor from abroad, Dr. Fedor Haenisch of Hamburg, and called attention to the large exhibition of radiographs in the Pathological Museum, and to the fact that the radiographic departments of the various hospitals would be open for inspection each day of the meeting. He then called upon Professor Rutherford to deliver the opening address.*

THE CHEMICAL EFFECTS PRODUCED BY THE RADIATIONS FROM ACTIVE MATTER.

By Ernest Rutherford, F.R.S.,
Langworthy Professor and Director of Physical Laboratories, University of Manchester.

I have chosen the title of my address, "The chemical effects produced by the radiations from active matter," because it appeared to me a subject of fundamental importance in the consideration of the therapeutic effects of the radiations from radium and other radio-active substances, and one that might prove of interest to members of this Section. It is well known that the highly active substances in ordinary medical use—for example, radium and its emanation, and the thorium derivatives, mesothorium, together with radio-thorium—emit alpha, beta, and

* In arranging the report of the proceedings for publication, the papers have been grouped according to the more or less distinct division of subjects which occupied the attention of the Section—namely, radium therapeutics, *x*-ray therapeutics, medical electricity proper, and finally, radiography. Therefore, the order in which the papers are printed is not necessarily that in which they were read.

gamma rays. The alpha rays are positively charged atoms of helium projected with a velocity of about 10,000 miles a second, the beta rays are negatively charged electrons projected with a velocity approaching that of light, while the gamma rays appear to be a type of very penetrating x rays. The corresponding types of radiation emitted by the radio-active substances mentioned above are identical in character, and do not differ much in penetrating power. It is, consequently, certain that, for equal relative intensities, the beta rays—for example, from radium or its emanation—would produce similar effects, whether physical, chemical, or physiological, to the corresponding radiation from a preparation of mesothorium. We should not expect to obtain reactions with the radiations from radium that would not equally well be shown by the corresponding radiations from a preparation of mesothorium.

It is of importance to bear in mind the relative penetrating power and the relative energy of these three types of radiation. It is difficult to give definite values to the distance of penetration in a given substance, since the alpha and beta types of rays are heterogeneous—that is, they consist of particles projected at different speeds. This is especially the case for the beta rays, where the soft rays may be from ten to fifty times more easily absorbed than the more penetrating rays.

Considering as an example a *thin* film of radium in equilibrium, about 90 per cent. of the total energy of the radiation emitted is in the form of alpha rays, about 5 per cent. in the form of beta rays, and 5 per cent. in the form of gamma rays. The alpha rays are completely stopped in $\frac{1}{10}$ mm. of aluminium, the beta rays are nearly stopped in 5 mm. of aluminium, while the gamma rays are only half absorbed in passing through 7 cm. of aluminium. In the case of ordinary tissue the thickness for complete absorption is two to three times greater than in aluminium. It follows from this that over the distance of penetration of alpha rays, the total energy absorbed in the form of alpha, beta, and gamma rays is about in the ratio 100,000 : 100 : 1. This enormous difference in the relative energy of the three types absorbed by a thin layer of matter must be borne in mind in comparing the relative effects produced by the alpha, beta, or gamma rays under certain experimental conditions.

A large number of observations have been made on the chemical effects produced by the radiations from radium or its emanation. The chemical effects due to the alpha rays are far more marked than for beta or gamma rays. Using large quantities of radium, marked chemical effects are produced by the alpha rays in the course of a few hours or days. These are best shown by adding radium emanation to a solution when the alpha rays have full play, or by using a very thin-walled glass tube into which purified emanation is compressed. I have here such a tube containing the emanation from about 50 mg. of radium, and its walls are so thin that the alpha rays readily pass through with little absorption. With this tube we can readily illustrate the brilliant luminosity exerted by the alpha rays in willemite or zinc sulphide; and also the definite range of the alpha rays in air before they are stopped. The rapid production of ozone from the oxygen of the atmosphere is clearly evidenced by the strong odour. The alpha rays also produce nitrogen oxide in the air. Such an emanation tube rapidly oxidizes a lead or aluminium plate brought near it, no doubt due to the ozone produced. If plunged in water it dissociates it at a rapid rate with the appearance of hydrogen or oxygen. The dissociation of water by the alpha rays is so rapid that about 200 c.cm. of hydrogen and oxygen are produced from a solution of 1 gram of radium per week. Marked chemical actions are produced by the emanation in many substances. For example, Ramsay and Cameron showed that HCl was split up into H and Cl, while CO_2 was decomposed into CO, O, and partly into carbon. The emanation rapidly decomposes the grease of stopcocks with the evolution of CO_2, and generally has a marked dissociating action on organic compounds. For example, in the course of some experiments of Dr. Boltwood and the writer, a large quantity of emanation was placed in a glass tube coated with solid paraffin. On opening the tube several weeks later it was found that a large quantity of gas had been evolved, while the paraffin had completely changed in appearance as well as in chemical and physical properties. Examples of this kind could easily be multiplied. It is now known that the alpha rays exert a marked action on haemoglobin and uric acid.

One of the most interesting properties of the alpha rays is the rapid coloration of glass and of certain kinds of mica. This is well evidenced by the beautiful pleochroic halos observed in mica. Joly has shown that these coloured halos are produced by the action of the alpha rays over geologic ages from a minute radio-active nucleus. These halos, which have been studied in great detail and with great skill by Joly, show in an unmistakable manner the range of the alpha rays from the different alpha ray products in the thorium or uranium nucleus. The coloration of glass or mica is no doubt the result of chemical changes brought about by the radiations, but the exact explanation is not yet quite clear.

The chemical effects of the beta and gamma rays have not been studied in the same detail as for the alpha rays, as long exposures to the radiation are required to produce marked effects. In general, however, there appears to be no definite evidence that the chemical changes produced by beta and gamma rays would not equally and far more rapidly be brought about by alpha rays. As far as observation has gone, the beta and gamma rays are able to dissociate complex molecules in much the same manner as the alpha rays; but the effects for a given quantity of radium are on a much smaller scale than for the alpha rays, on account of the much greater relative energy of the former.

The evidence so far available indicates that the radiations exert a strong dissociating action on complex molecules, and break them down into simpler forms. At the same time, under suitable conditions, there appears to be a reverse action. For example, hydrogen and oxygen recombine under the influence of the rays to form water while in the presence of oxygen, and many substances are oxidized. There appears to be no doubt that the chemical effects of the radiations are closely connected with the ionization which is known to be produced in gases and liquids, and probably also in solids. In the case of water the rate of production of hydrogen and oxygen is very nearly that to be expected if the ionization of each atom led to its dissociation. It is still doubtful whether this dissociation is connected directly with the production of ions or is a secondary effect following the act of ionization. The ionization produced by the alpha, beta, or gamma rays is similar in type, though differing widely in intensity and distribution. It seems reasonable to suppose that wherever ionization is produced in complex molecules by either of the three types of radiation, similar chemical effects are produced.

It is of interest to consider the distribution of the ionization due to each type of radiation. This is shown in a beautiful manner by some experiments that have been recently carried out by C. T. R. Wilson. In these experiments the trail of a single alpha or beta particle in passing through a gas is made visible to the eye by the condensation of water drops round the ions by the sudden expansion of moist air.

[Professor Rutherford here showed some photographs, in the first of which was seen the trail of the alpha particle, which travelled in most cases in nearly a straight line, but only occasionally showed a marked deflection due to an encounter of a specially violent nature with an atom. The number of ions produced per centimetre of air (about 20,000), he said, was so great that the individual drops appeared to coalesce into a continuous band. The case of a beta particle was very different. It did not travel in a straight line, but was deflected from its path by its encounters with atoms. Only a few ions were produced per centimetre of air, and these were clearly shown by the isolated drops outlining the path of the beta particle. He also showed the photograph obtained by Wilson of the distribution of the ionization produced by the passage of x rays through air. Bragg had long maintained that the x rays did not ionize themselves, but that the ionization was due to the beta particles which they liberated from the atoms of matter traversed. This was clearly shown in the photograph, and the tortuous paths due to scattering pursued by the beta particles were beautifully brought out. The gamma rays showed similar effects to x rays, only the beta particles liberated from the atoms were much swifter and travelled a much greater distance before they were stopped.]

Continuing, Professor Rutherford said: The ionization per unit path, whether due to an alpha or beta particle, increases as the velocity diminishes, and becomes far more marked near the end of its range. We should consequently expect a low speed particle to produce relatively more chemical action per unit path than a high speed one. Since, however, the high speed beta particle ultimately decreases in velocity and becomes a slow speed beta particle, the total ionization and consequent chemical action due to the latter is much greater than for a slow speed beta particle. There is some evidence to show that the chemical action relative to ionization is more effective when the alpha or beta particles are near the end of their path.

When we take into account the marked chemical actions that are produced by the radiations from active matter, it seems probable that the therapeutic effects of these radiations must be a result of the chemical changes brought about in the material the radiations traverse. This chemical action may result in a dissociation of complex molecules or the building up of complex molecules, or both may proceed together. While the ultimate causes of the changes observed are to be ascribed to definite chemical action, such chemical actions, no doubt, often result in physical changes in the material—for example, in the change of viscosity or surface tension of the fluids. These secondary effects probably often play a considerable part in the effects observed.

The chemical effects produced by the alpha, beta, and gamma rays, so far as they have been studied, appear to be very similar. Such a result is to be expected from the similarity and character of the ionization produced. We should consequently expect that each of these three types of radiation should produce very similar therapeutic effects when account is taken for equal intensities of the ionization produced in a given region. We should certainly anticipate that the effect of beta rays and gamma rays should be identical, for the ionization and chemical actions are in both cases due to high speed electrons. There may be in some cases slight differences between the effects of x and gamma rays. Sir J. J. Thomson, in his lecture to the Section two years ago, drew attention to the fact that x rays possess the property of setting up strong intense characteristic radiations in the substances on which they fall. On account of their small penetrating power this effect is far more marked for x than for gamma rays, and may result in special cases in marked variations of the intensity of radiations at different parts of a non-homogeneous material. While in the present state of our knowledge it is difficult to make definite statements on this question, there is certainly strong reason for believing that the physical and chemical effects produced by the three types of radiation are very similar. It is possible, however, that in some cases certain differences may arise on account of the enormous ionization along the path of the alpha particle compared with that of the high speed beta particle.

In comparing the therapeutic effects of the three radiations account must always be taken of the wide difference in the penerating power of the radiations, and the enormous difference in their relative chemical action at any given point. When these factors are allowed for, numerous investigations indicate that the bactericidal effect of the alpha rays is similar to that produced by beta rays. This has been drawn attention to by Miss Chambers and Russ in studying the bactericidal action of the rays from radium. It is of the highest importance in all cases to take account of the difference of penetration and ionization produced by the three types of radiation. We should expect, for example, the effect of the alpha rays to be confined to within $\frac{1}{10}$ mm. of the surface radiated. The effect of the beta rays may extend for about a centimetre, and the gamma rays through the whole organism. The property of radium of emitting a radio-active emanation of comparatively long period, which is readily soluble in water, makes it a comparatively simple matter to utilize the effects of the alpha rays, not only on the surface, but throughout a considerable volume. This can be done by injection of water charged with emanation. There is every reason to believe that the emanation itself is quite innocuous, and that the effects produced are due almost entirely to the alpha rays emitted from it, which have far more energy than the beta and gamma rays. No doubt, water solutions of thorium X and other active products would be equally serviceable. It would, however, appear highly undesirable to introduce unprotected the actual radium or thorium salts in the system. Apart from the poisonous action, at any rate of the latter, these may remain permanently in the system and ultimately destroy the tissues surrounding them. For this reason, the use of solutions of the radium emanation and of thorium X have very great advantages for the purposes of experiment. The method of applying the radiations to be employed will, of course, largely depend on conditions. In some cases a thin alpha ray tube may be very effective, or a wire made active by exposure to the radium or thorium emanation. In other cases the beta and gamma radiation from radium or mesothorium may be employed, or a solution containing the radium emanation or its active deposit may be introduced.

At the conclusion of Professor Rutherford's address,

Dr. W. DEANE BUTCHER said: It is the custom of the Electro-Therapeutic Section to ask some distinguished physicist to open its proceedings, and thus to mark the more intimate relationship between physico-therapy and science. We are fortunate on this occasion in our choice, for Professor Rutherford is the discoverer—may we not say the god-father?—of the ever-increasing radium family. He is no less fortunate in seeing the discoveries which have immortalized his name so promptly utilized for the benefit of mankind. I ask you to accord a most hearty vote of thanks to Professor Rutherford for the address to which we have all listened with so much pleasure.

The vote of thanks was accorded by acclamation.

DISCUSSION ON RAY THERAPEUTICS IN MALIGNANT DISEASE.

OPENING PAPERS.

I.—ERNEST H. SHAW, M.R.C.P.,

Director of Clinical Pathology, Great Northern Central Hospital.

THE ACTION OF RADIUM AND X RAYS ON MALIGNANT GROWTHS.

IT has been my privilege to examine many cases of malignant disease undergoing treatment by x rays and radium, and in many instances I have examined histological sections of the growths at intervals during this treatment for the purpose of studying the effects of the rays on the tissues. My earlier experience was gained during my association with Dr. Finzi at the Metropolitan Hospital; since then I have worked on cases with Dr. Robert Knox at the Great Northern Central Hospital. Observations have been made on cases of carcinoma of the breast, lip, skin, etc., and sarcoma of glands, abdominal wall, and other regions. The uniformity in the character of the histological changes discovered makes it unnecessary to give more than a few illustrative descriptions.

1. In a case of carcinoma of the breast of an aged woman a recurrence was treated first with x rays and afterwards with radium. The tumour and glands were reduced very much in size. The patient died suddenly from some other lesion, and material was obtained *post mortem* for histological investigation. Microscopic sections of the remains of the tumour showed a small spheroidal-celled carcinoma with a well-formed fibrous matrix; the cells stained well, and were seen running in narrow columns from the main mass into the surrounding fatty tissue. Another section showed fibrous tissue free from growth, which looked as if all the cells had been destroyed and replaced by fibrous tissue. A lymphatic gland showed growth with a very scanty amount of fibrous tissue, while a nodule in the liver showed cellular growth with partial necrosis. It is worthy of note that the nodule of growth which was exposed to the action of the rays was very fibrous, whilst the other deposits which were further away were poorly supplied with this tissue. Also the nodule in the liver, which was at some distance from the rays, contained a necrotic patch. In another case of recurrent carcinoma numerous nodules appeared in the skin about the scar shortly after an amputation of the breast. The woman was only 32 years of age, and, owing to the rapidity of recurrence and extent of the disease, no further operation was attempted. X rays were applied and the nodules of growth decreased in size in a remarkable manner, but they afterwards grew larger again. At the same time other nodules appeared,

and a large area ultimately became affected. Certain nodules were localized and at varying periods removed in order to ascertain what changes were taking place as a result of the application of the *x* rays. Microscopically the primary growth was a spheroidal-celled carcinoma with much fibrous tissue. The nodules showed exactly the same type of growth, the malignant cells were small and round, and lay in small groups in a dense network of fibrous tissue. They were well stained, and extended right into the papillae. No necrotic cells were to be seen. Numerous small round inflammatory cells lay amongst the cancer cells.

2. In a case of recurrent carcinoma of the skin repeated application of radium caused great shrinkage of the growth. Numerous small pieces were removed at intervals and examined microscopically. They showed a large amount of fibrous tissue in places; it varied in character, being in the form of fibrillated bundles in some parts and dense structureless or "hyaline" tissue in others. The cells of the growth stained well on the whole, but some were badly stained and necrotic. Small round inflammatory cells were plentiful.

3. A gentleman, aged about 50 years, had a large, flat ulcerating growth in the right tonsillar region, which also extended on to the soft palate. A very extensive operation would have been required to expose and remove the growth, which was a squamous-celled carcinoma. Radium was applied to the growth by Dr. Knox, and the growth decreased in extent in a remarkable manner; in a short time it had apparently disappeared. Later, however, a small recurrence appeared and was removed. Sections of this showed a very small piece of carcinoma surrounded by much fibrous tissue and small round inflammatory cells. Much of the fibrous tissue was of the "hyaline" variety. A second recurrence was removed, and showed the same fibrous and cellular changes. This patient is still well and free from any obvious signs of growth, twelve months from the date when he was first examined.

4. A man, aged 50 years, had a large mass of growth in the neck. Part of it was removed together with a piece of the internal jugular vein. It proved to be a small round-celled sarcoma. Treatment by *x* rays was followed by a temporary decrease in size of the main mass, but the patient ultimately died with large masses of growth in the neck and thorax. Microscopic sections of various parts of the growth showed round-celled sarcoma with very little fibrous change. A hard gland in the neck, which had been exposed to the action of the *x* rays, showed increase of fibrous tissue and necrosis of the central part of the growth. The peripheral cells stained quite well.

5. In a case of carcinoma of the breast of a woman aged 60 years, *x* rays were first aplied with the object of softening and breaking down the tumour, and this was followed by the application of radium. The growth was hard and fixed to the skin and nipple. Under treatment it gradually became smaller, and Dr. Knox informs me that it ultimately disappeared. A small nodule was removed from the skin over the tumour towards the end of the treatment and microscopic sections prepared. They showed a large-celled carcinoma in small amount, the cells stained well in some groups and badly in others, while other groups were represented by a granular necrotic mass. Fibrous tissue was abundant, some of it being "hyaline" in character. Small round inflammatory cells were distributed throughout the tumour. The squamous epithelium on the surface stained well in all parts.

On reviewing the changes described above, one finds that they include: round-celled inflammatory infiltration, formation of fibrous tissue in varying amount and density, and necrosis of tumour cells. Now what are we to infer from these changes? Can we attribute them to the action of *x* rays and radium? Before answering this question, I must make the following remarks: From long experience and the examination of microscopic sections of all kinds of tumours, I can affirm with every degree of confidence that all the above changes are seen repeatedly in tumours that have not been exposed to the action of *x* rays or radium. My interpretation of such changes is that they are due to reactive inflammatory processes on the part of the body tissues in their attempt to check and ultimately overcome the cells of the tumour. The fibrous changes, for instance, are very commonly seen in breast carcinoma, especially in that variety described as "scirrhus." In this one sees large masses of this substance in the more central—and therefore the oldest—part of the tumour. Round-celled infiltration is very common at the growing margin of a malignant growth. This may be taken to be due partly to the irritative action of the tumour cells on the surrounding healthy tissues and partly as a result of septic infection. The latter is always seen in cases of new growth of such exposed surfaces as the skin, tongue, rectum, and cervix uteri. Necrosis of parts of a malignant growth is a common feature; at an ulcerated surface sepsis is an evident exciting cause, but in the central parts of a tumour one must look for some other cause in many cases. The one that suggests itself is deficient supply of blood. With these facts before us we must not say that the changes seen in tumours after treatment by *x* rays and radium are due to those rays alone. They are not specific changes. The necrosis of tumour cells which occurs after treatment by *x* rays and radium may be caused by such rays, but we must remember that necrosis occurs apart from such treatment.

Malignant tumours undoubtedly diminish in size under the action of *x* rays and radium, but so they do without this treatment—in a small number of cases certainly, but they do. But the proportion of tumours which diminish under treatment is much greater than the proportion which do not. And then there is the fact that some growths actually disappear. This is a great encouragement to you all to persevere in the use of *x* rays and radium. Why does the tumour decrease in size? Are the cells destroyed and absorbed, or is it due to the action of the contracting fibrous tissue? I think both these causes are at work. They occur both in untreated and treated cases, but, as we know, they occur in a much greater number of treated cases.

Finally, I would summarize briefly as follows: Nature in her attempts to check and destroy the invading cells of a malignant growth brings all her inflammatory forces into line. *X* rays and radium act by destroying a certain number of malignant cells outright, but they act mainly as a stimulant to the healthy cells of the body to urge them on to still greater inflammatory activity.

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THE FORMS OF MALIGNANT DISEASE BENEFITED BY RADIUM TREATMENT.

RADIUM may be used in malignant disease in three different ways:

1. To prevent recurrence after operation.
2. To attempt to obtain a cure.
3. To relieve symptoms and prolong life.

1. In my opinion radium rays—at any rate, filtered radium rays—have *some* beneficial action on every growth if applied in a sufficiently early stage and in large enough doses, though on some types of growth their action is much more marked than on others. This leads to the view that they should be employed in every case of an operation for neoplasm as a preventive measure against recurrence; for any little deposit which the surgeon leaves behind will naturally be in an early stage of its development, and at the period of the disease at which an operation is undertaken the resistance of the patient will not have been very greatly lowered. Naturally all this applies with redoubled emphasis in the case of those growths which are affected readily by radium treatment in the later stages.

The radium is best applied in tubes at the time of the operation, these being left in the wound for a definite number of hours, and a subsequent external application being given five or six weeks afterwards.

2. I must first of all dismiss rodent ulcer with the remark that its disappearance is obtained in almost every case with very great certainty, no discomfort, and the absolute minimum of scarring.

In attempting to obtain a cure in the more malignant forms of growth we generally, if we fail in this, succeed in obtaining relief, but the methods used are not quite the same if there is no opportunity of obtaining a cure. The measures in the first instance will be far more drastic, and there will be no hesitation in utilizing the caustic as well as the selective actions of radium. In dealing with the result obtained it is necessary to remember the conditions under which we are working. Surgery, by the position which it has established for itself in the treatment of this disease, must still be regarded as the chief means of combating and dealing with it, so that practically every case we treat with radium is inoperable, and therefore at a far later stage than that at which the surgeon sees it. This is even more important than might appear at first sight, for, in my opinion, radium depends for its effect to a large extent on a vital reaction of the healthy tissues, and this, in the later stages of the disease, is missing. It is true that radium can be used as a caustic—that is to say, so large a dose can be given to part of a growth as actually to cause its destruction—but when dealing with the region

where the growth is spreading into healthy tissues this is inadvisable and the dose is regulated, so that the neoplastic cells are destroyed, while the healthy tissue cells are left intact. In dealing with such cases, however, one is in much the same position as if in a tuberculosis sanatorium one got nothing but hopelessly advanced cases to treat, and only the marvellous efficacy of the radium rays makes the treatment under such conditions possible at all.

The whole principle of the treatment is based on this fact—that the cells of a growth are more easily destroyed by the radium rays than the healthy cells, or, rather, that after an irradiation which is not excessive some change takes place, causing the growth cells to disappear and the healthy cells to remain. In the earlier stages of the disease all growths are more easily destroyed by the rays than the healthy tissues; but the amount of difference varies considerably with the nature of the growth, and its histological character furnishes a very good indication as to what results one may expect. The other factors which we have to take into consideration are the condition of the patient, the position of the growth, its accessibility to the rays, the extent to which it has spread, and the presence or absence of secondary deposits. It is obviously impossible to benefit by local treatment like this a patient in whom the disease has become generalized, though, if there is one solitary secondary deposit, and it seems unlikely that there are others, there is no reason why one should not attempt to obtain a cure.

From what I have said it will be understood that much larger growths of some varieties can be benefited than of others. Except in squamous epitheliomata the types of growth most readily influenced by the radium rays are those which grow most rapidly, and this is unfortunate, because these same cases are also the most likely to have secondary deposits. The most easily influenced growth of all is the round-celled sarcoma, and some of the cases which are described by some pathologists as endothelioma and by others as glandular epitheliomata, are almost as readily influenced. Rapidly growing glandular carcinomata are also often amenable to the treatment. When we come to epitheliomata we find that the rapidly growing ones, such as those of the vulva and of the tongue, are the least favourable, while those more slowly growing are often very beneficially influenced.

The question as to whether any operable cases should be treated is a very thorny subject. It is recognized that in some rapidly growing forms of malignant disease the surgeon can hope for very little after an operation, and it is his duty in these cases to consider whether the patient's chances of benefit may not be greater after radium treatment. In a rapidly growing squamous epithelioma of the tongue or vulva radium will not be of any use, but in a round-celled sarcoma it is quite a different matter, and incomplete surgical removal may simply spread the disease. In the more slowly growing cases the surgeon's results are good enough, but would probably be improved by prophylactic radium treatment.

In an inoperable case we have to consider whether radium is the best treatment, and, if so, whether we shall apply it in an attempt to obtain a cure or only to obtain relief. In certain forms of recurrence after operation where the disease appears localized—I refer especially to carcinoma of the breast—we know that there is at the same time a deep recurrence, and even though we may be almost certain of getting rid of the local trouble, we must be very careful about undertaking these cases, because an insufficient dose may be applied to a deeper deposit, and this might have the effect of accelerating instead of retarding its growth. For this reason I generally prefer, in dealing with recurrent breast cases, to use filtered *x* rays, which are less effective, but of which I can be sure to give a fair dose to the deposits that almost certainly exist in the mediastinum. In some of these cases, however, one has been able, by means of radium, to obtain so extremely marked a relief from pain, that it can be usefully employed in this way.

3. When it is a question of obtaining relief only and no cure can be thought of, it will often be found better, instead of giving a big dose every five or six weeks, to give a succession of small doses every day or every few days. In these cases, unless there is an open ulcer, care must be taken not to use the caustic dose of the rays. Many cases undertaken with the possibility of a cure will come under this heading, for a growth can often be got rid of for months or years, but we cannot talk of a cure if it subsequently recurs. My longest case at present has been well for over three years, and I started treating him soon after I commenced to use radium. Dominici has a case which has now been well for about five years.

All these remarks apply to the use of filtered radium radiations, the filter generally being 2 mm. of platinum; but in the case of rodent ulcer only ½ mm. of platinum.

Conclusions.

1. That radium should be used in every operation for malignant disease as a prophylactic.
2. That an attempt to obtain a cure should be made in inoperable cases, especially of rapidly growing sarcomata and carcinomata and slowly growing epitheliomata, as even if a cure is not obtained, marked relief is given.
3. That rapidly growing epitheliomata, except in the earliest stages, should be left severely alone.
4. That in rapidly growing neoplasms which are still operable, consideration should be given to the usual surgical results, and if these are bad, that radium should be tried when the type of growth is one readily influenced by the rays.
5. That the most readily influenced growths are the round-celled sarcomata, rapidly growing glandular carcinomata and endotheliomata, and slowly growing epitheliomata.

DISCUSSION.

Dr. ROBERT KNOX (London) agreed in the main with Dr. Finzi, although his own results, particularly in cases of rodent ulcer, had not been quite so successful. Several cases had done very well, while others for some reason did not respond at all, but went from bad to worse. Endothelioma on two or three occasions responded fairly well, and one case which was treated two or three years previously remained well to-day. Lupus and leucoplakia were fairly amenable. Dr. Shaw had referred to two cases which the speaker had treated with radium, one being an epithelioma of the tonsil, affecting the soft palate, in a gentleman aged 50 years. Fortunately, they were able to get sections of this growth on three occasions—before treatment, in the middle of treatment, and towards the end of treatment. Prolonged radium treatment applied to the tonsil and externally to the enlarged glands resulted in the clearing up of the growth. There was some recurrence, and radium was again applied, with, he believed, although he had not seen the patient for three months, quite satisfactory results. The operation, had it taken place, would have been a very extensive one, and as a result of radium treatment in its stead the man had enjoyed at least one year of comparative comfort and good health, and so far as he knew at present was perfectly well. The other case, one of carcinoma of the breast, was treated with the *x* rays extensively and for a long period. Radium was afterwards applied, and the effect of the radium superadded to the *x* rays was a much more rapid clearing up than that obtained with the *x* rays alone. The percentage of cases in which good results were obtained by means of the radium treatment was necessarily small because the majority of cases submitted were hopeless from any point of view at the beginning. But he was very doubtful indeed about tackling an early case of carcinoma with radium alone. His usual attitude under such circumstances was to recommend operation and prophylactic treatment by means of the *x* rays or radium. If the patient should refuse operation, of course, the matter was different. At the present time surgery in malignant disease offered the best chance if the case was treated early.

Dr. C. F. BAILEY (Brighton) cited a case within his own experience to suggest that there might be types of malignant disease more readily affected than others by *x*-ray and radium treatment. Certainly he had found that, in hospital cases more particularly, a course of treatment identical with that which had been successful elsewhere was not successful at all. Twenty years previously a lady, who was now about 60 years of age, noticed a lump in her breast, and for fifteen years that lump remained of about the same size. She avoided the idea of operation until, five years previously, it commenced

to grow. Within eighteen months she consulted a London surgeon, who advised immediate operation. A large operation was carried out—indeed, the breast was removed. Every vestige of the growth was supposed to have been taken away, and the pathological investigation pronounced it to be an ordinary scirrhus. It recurred within about a year, and six months later the patient again consulted the same surgeon, who then said that it was inoperable. Large masses of bands the size of a hen's egg extended towards the clavicle. The patient was sent down to the speaker at Brighton for such treatment as could be given her. He started treatment about two years ago, and since then the lady had been in comparatively good health. Various nodules made their appearance, and these, on being treated with radium, vanished. The main point, however, was that off and on, with intervals during which the case seemed to be quiescent, a hard type of *x* rays, generally equivalent to those obtained with a 4 to 5 in. spark-gap, were given. He always used hard rays projected through the thinnest of aluminium filters with two layers of tungstate lint, and for measurement he used the Sabouraud and later on the Hampson method. There was a certain amount of pigmentation of the skin, but never any dermatitis, and after two years the patient was in practically the same condition as she was before she had any operation. As time went on it showed that they were really obtaining some value in the work they did with regard to these cases. It was useless, however, to play about with *x* ray and radium radiations on dead tissue. The proper course was an operation to remove the mass of malignant growth, and afterwards the ray-therapeutist should be allowed to work at the underlying tissues where, in all probability, microscopic masses of cancer were growing. In rodent ulcer radium had proved very successful for a time, but a good many cases seemed to recur. Curiously enough, the old cases which were treated with the *x* rays in the early days, when, lacking as they did precise knowledge, the rays were poured in upon the ulcer, had not recurred. He had also been successful in a case of keloid, which had been operated on a number of times during seven or eight years. The surgeon who consulted with him agreed that the keloid should be removed, and that a large dose of *x* rays should be applied to the absolutely bare wound. The keloid had not recurred at all in this instance, although the operation had taken place three years previously.

Dr. FRANK FOWLER (Bournemouth) suggested, with regard to the case mentioned by the last speaker of a scirrhus of the breast which had remained without growing for fifteen years, that it might have been treated by means of the *x* rays with advantage. The speaker used a harder tube than the one employed by Dr. Bailey. His tube, indeed, was as hard as it could run; he used a filter of a quarter of a millimetre of aluminium, and found his technique sufficient invariably to prevent recurrence. He described also how in a breast case he "rayed" from many different directions—from the front, from behind, through the axilla, etc.—and working with this method, he could say that he had not seen any of his patients die from mediastinal growth.

Mr. J. HALL-EDWARDS (Birmingham) remarked that little new light had been thrown upon this question during the last five or six years. He had hoped that they would have heard something fresh, and would thus have been in a better position to treat their cases. The statement had been made in Dr. Finzi's paper that the cure of rodent ulcer was obtained in almost every case with great certainty by means of radium. This was not the fact. Small cases and cases in their early stages could be cured clinically for a time, but in nearly every instance they returned sooner or later. If they returned sooner, they might be cured a second time, but on the third or fourth recurrence neither *x* rays nor radium would do them any good. Even in the smallest rodent ulcers, such as those occurring in the corner of the eye, if the bone was attacked, it was almost impossible to achieve a cure. There seemed to be no new suggestion as to the various methods of treating these cases. It always appeared to him that from the striking results obtainable with radium in a certain number of instances there ought to be still better results in a far greater number. Certain cases, quite apart from any hard-and-fast rules as to the microscopical appearances of the tumour, were, for some reason or other, generally benefited by *x* rays and radium. He had seen some cases which had certainly been relieved, the relief persisting through a good number of years. In one case a patient lived in comfort for four years longer than she would have done without *x*-ray treatment. It was disappointing to have got so far and not to be able to get further. Having obtained such results, it seemed to him that they should be able to obtain much better ones.

Dr. ERNEST SHAW, replying upon the discussion, referred to Dr. Finzi's remark that cases of malignant disease ought to be subjected to doses of radium or of the *x* rays before operation. That was a very good thing, but before it was put into practice it ought to be decided how long these cases were going to be kept about in an unoperated condition. He did not think that Dr. Finzi meant that they should be kept about for weeks before operation, but that point should be made clear. When once a malignant growth was diagnosed as such and an operation was decided on, that operation should be undertaken practically immediately. An interesting point in the discussion had reference to the case of carcinoma of the breast noted for fifteen years, after which an operation was performed. He did not believe that the case was a carcinoma to start with. He had seen a good many cases of breast tumours. One was, perhaps, the size of the breast itself and just lately had begun to change. So that he thought the right procedure—that is, immediate removal—was followed in that case. It had been suggested that the forming of fibrous material was due to the action of *x* rays or radium, but one so often saw this particular action taking place in tumours which had not been exposed to these rays that the question must for the present be left open. Mr. Hall-Edwards was rather pessimistic as to the cure of rodent ulcer. It was certainly too strong a statement to make that all rodent ulcers were cured. After treatment they disappeared, even if only to recur, but it was quite worth while going on with these ray-therapies, especially when the ulcer occupied certain situations, rather than to fly to the knife in every case.

Dr. N. S. FINZI, also replying, said that Dr. Shaw was labouring under some misapprehension. All that he (the speaker) had suggested was that at the time of the operation when the growth had been removed the radium tubes should be left in the wound. That disposed of any idea that he wanted to treat growths before operation. Radium-therapy as a substitute for operation on operable growths was only urged in that class of cases in which the surgeon's results were so unfortunate that the percentage of success was down to one or two. It was acknowledged by the surgeons that rapidly growing sarcomas were extremely unfavourable cases, and it was here that he suggested the use of radium instead of an operation. Of course, in considering the abandonment of the operation, each case must be discussed on its merits. Dr. Shaw had referred to the long duration of breast tumours. The speaker had seen one which had been going on for nineteen years, and another for twenty-three years, both of them being cases of undoubted carcinoma. He owed an apology with regard to what he had said about rodent ulcer. He should have said, not that its *cure* was obtained in almost every case, but that its *disappearance* was obtained. In the cases he had treated he had failed once only. This patient, half of whose face was eaten away, was 85 years of age, lived at a considerable distance, and could not come up regularly for treatment. The other cases so far had not recurred. He strongly disapproved of the suggestion that cases in which there was a large amount of growth should have part of the growth removed by the surgeon before treatment. If a growth were removed and its growing edge were cut through, the lymphatic spaces were opened, and the risk of metastasis was enormously increased. In cases with a large amount of growth such a growth was an excellent medium in which to insert the radium. In applying radium advantage could be taken of its caustic action, and the dose could be regulated so that the edge of the growth received only a small amount of the rays. Mr. Hall-Edwards seemed to have forgotten

that they were not discussing results: in his paper he had limited himself to discussing the forms of growth for which radium was suitable. As far as his own experience went, his results with radium were far better than his results with the *x* rays. Dr. Knox had referred to the quickened action when radium superseded the *x* rays on a particular part. The difference was possibly due not to the sum of both, but to the radium, and if radium were applied upon one nodule and the *x* rays upon another it would be noted, generally, how much more rapid was the disappearance of the nodule in the former case. With regard to Professor Rutherford's address that morning, it ought to be said that the clinical results did not quite correspond with what the physicists expected of them. The treatment of carcinoma with radium rays had certainly been revolutionized since they employed the penetrating rays, which were chiefly gamma rays. The results were much better than those which followed the employment of the whole of the radium rays.

Professor Rutherford, in reply to Dr. Finzi's last remark, reiterated his contention that the rays were the same in kind, although the beta rays would act on the surface, while the gamma rays penetrated to a depth. He was fairly confident that there could be no real distinction between the beta and gamma rays apart from this difference of penetration, and, the physical action being so similar, it was nothing short of wonderful if there was much clinical difference. Under conditions in which about the same amount of energy was absorbed one would expect in all cases the beta and gamma rays to produce the same effects. There might, of course, be differences in local treatment due entirely to differences in intensity. But it seemed to him an enormous gain if it could be shown definitely that under comparable conditions the beta and gamma rays produced the same result. Progress must be very slow if a different virtue appertained to each different arrangement, and he doubted whether that was really the case.

AN INQUIRY INTO THE CAUSES OF FAILURE OF X-RAY TREATMENT IN DEEP-SEATED CANCER.

By Francis Hernaman-Johnson, M.D.,
Darlington.

In the course of a paper read before this Section at Birmingham last year,[1] Dr. Reginald Morton advanced the view that such Roentgen rays as penetrate more than about 1 cm. into the tissues are practically without therapeutic value. This opinion was presumably based upon the clinical experience of the writer, but previously to the Birmingham Meeting well-known physicists had also cast doubt on the efficacy of the harder radiations as remedial agents. Again, Dr. Deane Butcher, speaking of radium, deemed it unlikely that by any system of filtering we can destroy, or even greatly retard, deep-seated malignant growths. It is true that during the subsequent discussion some speakers controverted these views; but, on the whole, the tendency during the past two years has been to take a somewhat gloomy view of the prospects of radiotherapy in cancerous tumours not situated near the surface of the body.

The results of *x*-ray treatment of superficial epitheliomata, and notably of rodent ulcer, are, on the whole, at least as satisfactory as those obtained by any other method, whereas in the case of neoplasms lying at a depth of some centimetres the benefit obtained is usually small. The difference is not, however, so great as might at first sight appear; for, on the one hand, relapse is common in rodents, and they sometimes refuse to heal even temporarily; while, on the other, it is possible to find in the literature not a few instances of great improvement following the administration of *x* rays in deep-seated disease. Despite the fact that its malignancy is chiefly local, rodent ulcer is generally admitted to be as truly cancerous as, let us say, a carcinoma of the colon. Relapse in a rodent is believed to be due to the fact that the malignant cells of its deeper parts have not been killed; if, therefore, we inquire into the possible causes of relapse in rodents after apparent cure by rays, we may hope to shed some light on the comparative failure of similar treatment in more deeply seated disease. It is at least certain that if we cannot learn how to deal effectively with cells at a depth of a few millimetres it would be futile to expect to influence those at a distance from the surface ten times as great.

In the first place, why do *x* rays cause a rodent to heal even temporarily? The usual theory is this: *X* rays are, to a certain extent, injurious to all cells. Malignant cells are of lower vitality than normal cells; hence, a dose from which normal cells can recover may prove fatal to cancer cells. The action is thus held to be similar to that of carbon-dioxide snow, or, as Dr. Bashford put it in an article now famous through the daily press, *x* rays and radium are the best caustics known, but still, simply caustics. Such a view is worthy of the days when all the phenomena of absorption and secretion were held to be explicable by the ordinary laws of diffusion and osmosis. No known caustic can produce at one and the same time stimulation and depression; yet this is accomplished by *x* rays. In the case of a chronic varicose ulcer we see an action wholly stimulating. A surface epithelioma not yet ulcerated shows under rays a gradual absorption, chiefly due to depression and death of malignant cells. A healing rodent displays to us both these processes simultaneously —destruction of cancer cells proceeding coincidently with increased activity of normal epithelial and connective tissue elements.

If we accept the biological view of the cancer cell, regarding it as a reversion to an earlier type, its behaviour under Roentgen irradiation is seen to be only what might be expected from what we know of the effects of radioactivity on cell life in general.

Roentgen rays, even in minute doses, are injurious to young cells, or to cells retaining the peculiarities of extreme youth. A man may be rendered sterile without any discomfort or injury to the skin of the scrotum. The growing kittens in a cat's womb may be killed without even causing the hair of the mother to fall out, or in any way inconveniencing her. Now, the cancer cell is a cell which has resumed certain embryonic characters. It has become simple in structure and function, tends to divide and subdivide with great rapidity, and, like the fertilized ovum from which it sprang, seeks to live upon its immediate surroundings. According to the views of Mr. Hastings Gilford, as set forth in a recent work,[2] such cells are the subjects of a regressive variation. They are prematurely senile, and therefore present a kind of anarchic caricature of their infancy. Why *x* rays should be destructive to embryonic cells it is not my purpose to discuss; but it is because the cancer cell is of this type that the *x* ray seeks it out amid its normal brethren—seeks it as definitely as quinine does the parasite of malaria, or mercury the spirochaete of syphilis. Quinine, if too much is given, will kill the patient, as also will mercury; yet we do not therefore deny the selective action of these remedies on the causative organisms of malaria and syphilis. Absolute selection does not exist in medicine; but the action of *x* rays on embryonic cells is as truly selective as any known to therapeutics. It must be borne in mind, however, that malignant tumours differ in the degree to which their cells approach the embryonic type, and consequently vary in their susceptibility to ray treatment.

I have dwelt on the doctrine of reversion to embryonic type because it seems to me that it furnishes us with a clue to the therapeutic action of *x* rays in cancer, rheumatoid arthritis, spinal cord degenerations, leukaemia, and other maladies classed by Gilford among "disorders of post-natal growth and development." In rheumatoid arthritis, for example, connective tissue is destroyed by rays, because it is senile or pseudo-embryonic in nature, and its presence is pathological; in cancer the growth of new connective tissue is stimulated by the same agent, as in this case it constitutes a natural means of defence. Not only has this theory enabled me to fortify an instinctive belief in the selective action of *x* rays by sound biological arguments, but it has also allowed me to banish from my mind the fear of actually stimulating deep-lying cells by insufficient dosage. This has been suggested as a possible cause of failure by well-known authorities—notably, Professor Rowntree.[3] That moderate doses of *x* rays have a stimulating effect on normal tissues is, fortunately, beyond doubt; but it does not follow that very

small doses will have a similar effect on malignant cells. Approaching the matter from the clinical side, I have endeavoured to determine the smallest dose of rays which would benefit a rodent ulcer; and I have seen distinct improvement from the employment of only one-fifth of a milliampère of secondary current for seven minutes twice weekly, the anticathode being 25 cm. from the skin. Biological experiment also tends to discredit the deep-stimulation theory as an explanation of therapeutic failure. Dr. J. F. Gaskell, in the course of a paper read last year before the Royal Society,[4] states that even very small doses of *x* rays have a retarding effect on the cell mitosis of developing chicks. It is true that a chronic Roentgen dermatitis may become malignant, but in this case the skin is first broken; the influences at work are not limited to *x* rays, and bacterial toxins may in reality be the exciting cause.* On the whole, it appears fairly evident that the Roentgen dosage received by the deeper parts of a tumour, though it may not be enough altogether to inhibit the growth of cancer cells, certainly does not increase their vitality.

In every case of rodent ulcer which heals satisfactorily on the surface it is probable that the superficial cancerous tissue has been killed, and sufficient rays have reached the deeper malignant cells to hold their proliferating activity in check during the actual course of treatment. But in many instances the dosage received is insufficient actually to kill these cells, and relapse inevitably follows. That the mitosis of embryonic cells can be inhibited for long periods without permanently damaging them is a matter beyond doubt. Dr. Gaskell, in the paper above referred to, tells us that for each day of development there is a certain *critical dose* which kills the embryo; whereas from anything less than this it will, in time, recover. This critical dose varies with what is known as the *mitotic index*, this being the number of divisions per 1,000 cells occurring in a given time. As the index diminishes, so does the critical dose. Instances are on record of radiologists who have been sterile for months or years,[5] but who have quickly recovered so soon as they took proper measures of protection. Moreover, even with deliberate intention, it is often difficult or impossible permanently to sterilize women not near the menopause.

If I am right in believing that *x* rays depress cancer cells because they have become embryonic in type, then the above-quoted experiments and observations may help to explain the cause of failure or relapse in some cases of cancer. We shall not, I think, exceed the bounds of legitimate hypothesis if we assume that for the cells of any given tumour there exists a critical dosage of *x* rays from which they are unable to recover. This dosage will vary according to the mitotic index of the growth concerned. The mitotic index, again, will differ in various tumours, even such as closely resemble each other from a clinical standpoint, and will not remain a constant even for the same tumour. I use the term "critical dosage" rather than "critical dose," because the amount need not necessarily be all delivered at one sitting; whichever term is used, the idea to be conveyed is one of definite quantity within a definite time. Thus, the determination of the number, strength, and frequency of irradiations is seen to be a matter of the utmost importance; for a dosage below that which is critical for the cells of a given tumour will never kill these cells, no matter if it be administered for months or even years.

To treat a rodent ulcer with unfiltered rays from a medium tube is to invite failure, for the surface receives a bombardment wholly disproportionate to that sustained by the deeper layers. Not only are numerous soft rays emitted from the anticathode, but a vast number of *adventitious primaries* are given off as a result of electrons striking on the glass of the bulb. All these are highly active physiologically within narrow limits, and as a consequence the ulcer heals rapidly on the surface. Cessation of treatment will almost certainly be followed by relapse, while persistence will result in surface irritation.

No case of rodent ulcer should relapse because the deeper layers have received a relatively feeble dose of rays. Bulbs can be obtained whose radiation, after being filtered through 2 mm. of aluminium, will penetrate at least 3 to 4 cm. of tissue before falling to half value, and they can be excited by any good modern coil worked from the main. The fall in value at a depth of 1 cm. is so trifling that it may be disregarded. It may be objected that these very hard rays are lacking in therapeutic value. But Finzi and others have proved that this is by no means the case, and I have myself brought about the healing of a patch of psoriasis after having passed such filtered rays through 2 cm. of water, at the same time carefully excluding all possibility of secondary ray effects. One must remember that the blood contains an appreciable amount of iron, the secondary radiation of which is highly active at short ranges. The trouble with very penetrating rays is not so much that they are inactive therapeutically as that a large proportion of their energy passes right through the lesion and is lost. By applying the principles of secondary ray therapy, this waste energy may be trapped and made to do work where it is most needed. For the past year I have employed in the treatment of rodent ulcer hard filtered rays intensified by the specific secondary radiation from silver or zinc, and am well pleased with the results so far; but it is as yet much too early to form any conclusion as to whether this modified technique materially reduces the tendency to relapse. In the meantime I am not unmindful of the possibility that, even though we convey a critical dose of rays to every cancer cell in a given tumour, we may not thereby cure the disease. For it is conceivable that, at any rate in a proportion of cases, some irritant remains which continually provokes fresh normal cells to premature senile degeneration.

To attack the problem of the treatment of deep-seated cancer by observations on rodent ulcer is open to any one possessing an *x*-ray apparatus. Another method, recently made possible by the success of Carrel and Burrows, in the growing of cancerous and other tissues[6] *in vitro*, requires the collaboration of a skilled pathologist. By the irradiation of living neoplasms under experimental conditions outside the body, we should be able to ascertain:

1. The minimum dosage required permanently to stop growth.
2. Whether recovery is complete from any dosage less than this.
3. Whether the minimum dosage varies according to the rate of growth.

Put in other words, does there exist for every malignant tumour a "critical dosage," and, if so, is it determined in all cases by the "mitotic index" of the tumour concerned?

By the coincident exposure to *x* rays of normal tissues and their malignant derivatives, it may be possible to obtain direct experimental proof of specific vulnerability in cancer cells. From this it is but a step to the determination of the maximum depth at which an efficient dose can be delivered without permanent injury to superjacent healthy structures.

Whatever the result of such experiments, they would teach us to regard malignant tumours from a dynamical rather than a statical point of view. A cancer is a cell-mass moving along a line of growth, and developing kinetic energy according to its mass and its velocity. Clinical similarity between two growths is recognized by radiologists to be no guarantee of similar reaction to treatment. This is looked upon as puzzling; but if the kinetic energy of one tumour were proved to be in reality twice that of its apparent fellow, difference of behaviour could no longer be regarded as an anomaly.

Meanwhile, we, as physicians practising a speciality, are called on to do our best for inoperable or recurrent cases of internal cancer. Knowing what we do of the relative susceptibility of the cancer cell to *x* rays, we may assume that a dose equal to half or even one-quarter the maximum which can be tolerated by the integument is still effective as a depressant to such cells. Existing methods enable us to give this amount at a depth of between 3 and 4 cm., even when only one skin path is available. But we may often reach a deep-seated lesion by two or more such paths. It is my own practice to irradiate with two tubes connected in parallel, and so placed that their normal rays either meet at right angles or are in opposition. A "cross-fire" effect is thus obtained. The anticathode should be not

* According to Gilford, cancer may be a major or a minor variation. In the latter case the inherent degenerative tendency is manifested only when called into play by a definite environmental stimulus. *Any* unfavourable influence—bacterial, chemical, mechanical, electrical—may suffice to start predisposed cells on a downward course.

less than 35 or 40 cm. from the surface of the body, so that for practical purposes we may disregard loss of energy owing to divergence of the incident rays after they enter the tissues.

In treating rodent ulcers we can look out for and deal with small relapses, and there is little likelihood of dissemination. But in cancers of the viscera we cannot see what is going on, and it is therefore necessary always to give the largest amount of *x* rays which the skin will stand. *The risk of metastasis can be forestalled only by a careful study of the sites peculiar to each form of cancer, and by their prophylactic irradiation.*

When very stout subjects are concerned, the hardest existing bulb is not always capable of delivering an effective dose to an internal tumour without grave injury to the skin. We must therefore demand from the makers an increase in the penetrative power of their tubes. Although it is theoretically possible to construct tubes of much higher penetration, yet the practical difficulties in the way of increase are very considerable. Personally I am of opinion that if tubes were made longer, of thicker glass, and with a wide space between the cathode and the walls, it would be possible to drive them at very high voltage without causing sparks to travel outside and break the glass. We should aim at a penetration at least double the maximum now attainable, and for this an equivalent spark-gap of 18 in. to 20 in. will be necessary. Having obtained rays of such extreme hardness, we must learn how to utilize their energy to the best advantage. If I have hitherto referred only briefly to the use of secondary rays, it is because my time is limited and I have fully discussed the matter elsewhere.[7] By the introduction of heavy atoms into tumour cells it is possible actually to produce a greater physiological disturbance at a depth of 2 cm. than at the surface itself. Wassermann claims that he has succeeded in introducing salenium atoms into malignant cells without seriously affecting normal cells; when this can be accomplished easily and safely the problem of *x*-ray dosage in deep-seated cancer may be considered as solved.

Granting that the physiological action of *x* rays on the tissues is increased by the presence of heavy elements, the converse should also hold good. The diminution of the iron content of the skin by adrenaline prior to deep irradiation is therefore a procedure resting on a sound theoretical basis.

In dealing with inoperable visceral growths, it is our plain duty to seek to remove any probable cause of failure. If there be anything in the doctrines of selective action and critical dosage, such a cause is not hard to find. In any case, until we have learnt how to irradiate a gastric carcinoma as thoroughly and as fearlessly as if it were a rodent ulcer, we have no right to conclude that to benefit the former is beyond the power of our art.

REFERENCES.
[1] BRITISH MEDICAL JOURNAL, October 14th, 1911, p. 901. [2] Hastings Gilford, *The Disorders of Post-natal Growth and Development*. [3] Rowntree, quoted in *Med. Ann.*, 1910, p. 208. [4] Gaskell, *Proc. Roy. Soc.*, series B, vol. lxxxiii, No. B, 564, pp. 305–310. [5] Wullyamoz (*Arch. d'élect. méd.*, January 25th, 1910), quoted in EPITOME, BRITISH MEDICAL JOURNAL, 1910, p. 76. [6] Carrel and Burrows, quoted in *Med. Ann.*, 1912, art. Cancer; see also BRITISH MEDICAL JOURNAL, July 20th, 1912. [7] Hernaman-Johnson, *Proc. Roy. Soc. Med.* (Elect.-Therap. Sec.), March, 1912.

THE STANDARDIZATION OF RADIUM DOSAGE.

By E. H. HOWLETT, F.R.C.S.,
Surgeon, Hull Royal Infirmary.

RADIUM is used therapeutically in two forms: (1) As a solid, (2) as an emanation.

In this country little is known of its employment as an emanation, so I shall confine my remarks to the first form—the solid bromide of radium.

Given a case of lupus or rodent ulcer, the question which at once presents itself to the mind is, "What is the correct dose to administer?" It seems a simple question, but when one consults the various recorded cases that have been successfully treated, the quantity of radium has varied, also the duration of the exposure, and yet each method has effected a cure or improvement.

Wickham and Degrais, in their excellent work on radium therapeutics, at p. 8 say, "It is not sufficient to say that an apparatus contains 0.05 of the salt with an activity of 500,000 units. We must show what issues from it." Further, on p. 114, we have the report of a case of rodent ulcer treated by an applicator containing 0.03 cg. of radium bromide for three and three-quarter hours.

Compare this with a rodent treated by Ross MacDonald and published in the BRITISH MEDICAL JOURNAL of December 9th, 1911. Here 250 mg. were applied for twenty-four hours through a 2½ mm. platinum screen. The result in the two cases was apparent cure, but the dose employed by the two operators was widely different. So we might go on multiplying examples and making confusion worse confounded.

Dr. Dawson Turner, in the *Lancet* of December 25th, 1909, and again in his little book on *Radium, its Physics and Therapeutics*, has suggested the adoption of a standard, and for his own use has taken 1 mg. applied for one hour.

If it is necessary to have a definite standard to work to, why has it not already been adopted? The answer, I think, lies in the fact that the number of workers with radium is small, also that each operator working with his own apparatus gets to know its value and unconsciously works to a standard.

This is most unsatisfactory, and it has been brought very forcibly before me in my own work in the city of Hull. Here we are in an unique position. Some two years ago a medical man wrote to the local papers deploring the death-rate from cancer and extolling the curative powers of radium. This letter caught on, and by the next post the editor received a postal order for sixpence, the widow's mite, towards a fund for the purchasing of radium for the public use of the city. Money poured in, and in a short time about £1,000 was received and placed at the disposal of the editor for the purchase of radium. Once purchased, the next problem was how to employ it, and this was solved by handing it over to the Corporation for the benefit of the public. The city Corporation are at the present time the holders, and are prepared to lend it free, in the case of the necessitous poor, or for a small fee in the case of the well-to-do.

On behalf of the Royal Infirmary I have made use of this offer, and once a week have borrowed the town supply for the use of Infirmary patients—with what results is another story. Suffice it to say that I am thoroughly impressed with the powers of radium, and have seen more promising results from its use than from any of the several methods of treatment that have been adopted in the past, such as *x* rays, electrolysis, tuberculin, and snow; but in cases of advanced cancer I am a sceptic, as it has failed in my hands miserably.

There was no dearth of cases, as may be readily imagined; but when it came to the use of the applicators trouble began, as they all varied in the quantity and quality of the radium present. Again, it was not possible always to use the same applicator on the same patient; therefore some sort of general standard was a necessity if any work was to be done.

I adopted the following as a standard—namely, 1 cg. or 10 mg. of radium bromide at 500,000, acting for one hour. It may be argued that this is a rough standard, yet at the same time it has proved a very useful one. Now in treating a case one has merely to order the number of standards, and the house-surgeon can employ any one of the applicators at his disposal.

Such a standard, too, is of the greatest help to any practitioner who wishes to borrow from the Corporation. Whether it is an advantage to the public that radium can be employed by any practitioner, or whether it is better to limit its application to a few specialists, is a point that time will probably settle. My own view is that after a time the practitioner will give up its use, as soon as the novelty has worn off, and will send his cases to the specialist. What has been done in Hull may readily be done in any town in the kingdom, and it may be that our example will be followed, and that we shall have corporations all over the country with a supply of radium for the use of the public.

The question of a standard is not so simple as it would at first thought appear. We have to take into consideration the employment of screens and protecting devices, such as silver tubes, in both of which cases the quality of the rays varies. It is also necessary to consider the special rays formed by the action of radium on a metal.

Although there are difficulties, they are not insurmountable, and I will bring my short paper to a close by suggesting that a small committee be formed to work out the subject.

DISCUSSION.

Mr. W. DEANE BUTCHER said that, talking with Professor Rutherford at the Brussels Congress a year or two ago, he found that physicist to agree with him that an international standard might well consist of the amount of pure metallic radium per square centimetre of applicator. It would be fairly intelligible if patients were treated with an applicator measuring a certain number of square centimetres with so much standard metallic radium per square centimetre. It would be far better to give in units the exact quantity of the metallic radium content than to speak of activities in terms of millions. The only factors requiring to be known were the exact quantity of metallic radium and the exact area of the applicator, if flat, or its exact volume, if a capsule.

Dr. FINZI thought that such a standard as Dr. Deane Butcher suggested would be useful in the case of a flat applicator, but that it would be difficult to determine in the case of a capsule. He agreed that all radium measurements should be made in terms of pure metallic radium.

Dr. W. HOLDER (Hull) asked whether there was not already in existence a sufficient and convenient standard by which metallic radium could be measured.

Dr. HOWLETT, in reply, quite endorsed what Dr. Deane Butcher had said with regard to the great necessity for the formation of some sort of standard to work to. If the public action that had taken place in Hull were followed throughout the country—and it was quite possible that it would be—it was the more important that some simple form of standard should be adopted. The difficulties involved in the framing of such a standard were considerable, and for that reason it required the assistance of both mathematical and scientific experts.

Mr. DEANE BUTCHER suggested that it would be an advantage if a small committee could be brought together to formulate some such standard.

THE THERAPY OF THE RADIO-OXYGEN BATH.

By WILLIAM ARMSTRONG, M.R.C.S.,
Buxton.

IN Germany and in the United States of America both the radio-oxygen and the oxygen bath are being largely used with excellent results. Unfortunately, the oxygen bath was originally administered by means of artificially manufactured gas. The coefficient of absorption of water for such chemically inert oxygen (soluble only to a very small degree in water) is practically negligible, and there is no real impregnation of the water with the oxygen, which is driven through at high pressure, and fails to obtain lodgement on the skin.

In 1904 Sarason conceived the idea of directly generating oxygen in the bath itself, and used this with remarkable success. In 1906 Zeulzer recorded cases showing oxidizing properties influencing the skin metabolism, and also reported great relief to neuralgic pains, lauding its analgesic action. In 1907 Biedert wrote that the oxygen bath regulated, strengthened, and quieted the heart. Munk and Laqueur found it very helpful in cases of tabes. Franze and Poehlmann noted diminution of pulse frequency, lessening of pulse tension, and a general sedative effect on the nervous system, and spoke of brilliant results in severe cases of polyneuritis. Winternitz wrote enthusiastically of the nascent oxygen bath, saying that this was not in any way to be compared with that charged with atmospheric oxygen; the former having much stronger conductive powers, the nascent oxygen bubbles being smaller and more closely deposited, thus setting up a much more effective excitation of the nerve periphery. He observed that the pulse frequency lessened, that the skin became pale, and that active rhythmic contraction of the skin capillaries took place: that the blood pressure fell (which he considered to be due to dilatation of the muscle vessels as demonstrated by Carl Ludwig), and that the increased activity of the peripheral heart sustained the central heart. He quoted excellent results in nervous and organic heart troubles, and in various general nervous affections. Tornai records a rise both in haemoglobin percentage and in the number of red corpuscles.

Naumann reported very good results in bronchial asthma; patients who complained of dyspnoea, precordial anxiety, vertigo, and palpitation in the CO_2 bath being quite free from these symptoms in the oxygen bath. Sommer, Meugest, Frankl, Meuller, and Dumster lay stress on the refreshing, stimulating, and at the same time sedative effect of this treatment.

My own experience covers the administration of over 600 oxygen baths, of nearly 2,000 radio-oxygen baths, of about 500 Nauheim oxygen baths, and of some 100 Schwalbach or effervescing iron baths, substituting oxygen for CO_2.

Whatever can be claimed for the simple oxygen bath can be urged still more strongly for the radio-oxygen bath. In the latter there is much increased efficacy in cases of gout, rheumatism, neuritis, and arthritis, as the radium emanation greatly stimulates the output of body waste by lungs, skin, kidneys, and bowels. Some of my radio-oxygen baths have been given with artificially produced radium water and others with the natural radio-active water of Buxton.

The Preparation of the Bath.

Radio-active water of a strength of from 5 to 50 Maché units per litre is provided. A white powder (perborate of soda which has locked up in itself 11 per cent. of available oxygen) is sprinkled over the surface of the bath, followed by a second powder, the catalyzer (the key which unlocks the oxygen door of the perborate), which consists of one or other of the salts of manganese. Effervescence begins at once, and millions of most minute bubbles of oxygen are evolved, the process going on for from twenty to twenty-five minutes. Sarason and Morganstern's preparations have been used, but the most effective and the least expensive is "radiozone," skilfully devised by Wright of Buxton. This gives off in each bath from 35 to 40 pints of freshly evolved nascent oxygen.

Temperature.—The bath may be given from 98° down to 88° F. At the higher temperatures it is most effective in insomnia and restlessness; at the lower ones in increased arterial tension.

Duration.—From ten to twenty-five minutes, commencing with a short bath and gradually increasing the length of immersion. The bath is formed into a mild alkaline hydrogen dioxide solution, in which the liberated oxygen develops a disinfecting and oxidizing action on the skin.

Action of Radio-oxygen Bath.

1. The radio-oxygen bath acts directly on the skin and its sensory nerve endings; indirectly on the heart, vascular system, nervous system, kidneys, and blood.
2. It gives an inhalation of radium emanation and oxygen, a portion of the gas being given off as ozone, a form in which its chemical activity is highly intensified.
3. While it does not alter the size of the normal heart, or the pulse-rate or tension of healthy individuals, yet when there is organic or functional heart affection or arterio-sclerosis it diminishes increased heart volume, with a corresponding reduction of pulse-rate and blood pressure; it augments the rhythmic contractions of the skin capillaries (the pulsation of "Hutchison's" peripheral heart), with simultaneous dilatation of the vessels in the muscles.
4. It causes collective mechanical irritation of the nerve terminals of the skin by which, reflexly, the heart is steadied and strengthened.
5. It brings about increased diuresis (Rogovin says oxygen has a specific action on the kidneys).
6. Encourages skin respiration.
7. Produces abatement of insomnia, wakefulness, hyper-excitability, tachycardia, dyspnoea, and lessening of respiratory disturbances.
8. It has a marked analgesic influence, greatly relieving the pain of rheumatism, gout, neuritis, and arthritis.
9. In Basedow's disease it reduces the abnormally augmented metabolism, the amount of nitrogen excretion being lessened, and the quantity of urinary salts increased.
10. Its effects include the reduction of skin hyperaemia, hypersensibility, and irritation.

Therapeutic Indications.

1. Cardio-neuroses with tachycardia and arrhythmia, especially those of the post-influenzal type.

2. Organic heart troubles with hypertension.
3. Arterio-sclerosis (except in the latest stages).
4. Angina pectoris (during intervals between attacks).
5. Bright's disease and high arterial tension.
6. Arthritis: gout, rheumatism, neuralgia, neuritis, polyneuritis, neurasthenia, hysteria, functional neuroses.
7. The nervous affections of the menopause.
8. Various dermatoses, urticaria and pruritus.
9. Basedow's disease.

Contra-indications.

Low arterial tension.
Advanced arterio-sclerosis.
Acute gout and rheumatism.
Valvular heart disease with insufficient compensation.
Fatty heart.

Undoubtedly the most important field for the radio-oxygen bath is that of early arterio-sclerosis and increased arterial tension. I believe that during recent years, coincident with the decrease in acute "plus formation" gout and the marked increase in irregular "minus excretion" gout, there has been a distinct increase in the actual number of cases of arterial hypertension; but whether this be true or no, there are now many more such cases detected than formerly, largely owing to the provision of accurate recording instruments. If physicians, especially at spas, fail to note this indication, they may easily administer treatment which puts up the blood pressure with most unfortunate results. In arterio-sclerosis the oxygen bath seems to exert a mild gymnastic effect on the vessel walls, which opposes the progress of the disease and relieves the heart. The addition of oxygen to natural radio-active waters not only enhances their normal efficacy but also makes for much greater safety in their administration. "Accidents" at bathing stations have mostly been due to excessive arterial tension, especially in elderly patients.

The effervescing saline bath, known as the "Nauheim," the ingredients of which are salt, calcium chloride, and carbonic acid, frequently, in my experience, raises blood pressure, and I strongly advocate the use in hypertension cases, where the salines are thought necessary, of oxygen instead of CO_2. In conclusion, I would emphasize the following points:

1. The oxygen bath has been proved by many distinguished observers to exert a marked influence in the treatment of disease.
2. By its tonic action on the heart and the simultaneous reduction of blood pressure its use is definitely indicated in those cardiac and kidney cases where hypertension is present.
3. Through its remarkably tonic and soothing action on the vasomotor nervous system and especially its definite effect in producing calm natural sleep, it is of great value in the important group of functional neuroses, especially those of the climacteric.
4. By its blanching and sedative action on the skin, it is of considerable service in many hyperæmic and irritable skin affections, especially the various dermatoses.
5. The radio-oxygen bath (by reason of the effects of radium emanation in greatly increasing the output of body toxins through the lungs, skin, and kidneys) possesses much greater efficiency in gout, rheumatism, arthritis, neuritis, and auto-intoxication than the oxygen bath alone.
6. The natural radio-active waters, such as those of Buxton, Bath, Wildbad, and Gastein, can by this simple addition be made much more effective in the treatment of many troublesome ailments.
7. This combination is of exceptional value in cases of gout and allied diseases in which there is increased blood pressure, takes away the risk of giving mineral baths to such cases, and makes an ideal bath for elderly and delicate patients.
8. The "Nauheim" effervescing saline baths show greatly improved results where hypertension is present from the substitution of the radio-oxygen for CO_2.
9. The Schwalbach (or effervescing iron) bath, so efficacious in utero-ovarian troubles, is more effective with oxygen than CO_2 on account of the soothing tonic effect of the former—a matter of great importance in cases where the sympathetic nervous system is so often hypersensitive and disordered.
10. The substitution of oxygen for CO_2 avoids the tendency of the latter to produce dyspnœa, vertigo, precordial anxiety, and palpitation due to inhalation of carbon dioxide.
11. The inhalation of the radio-oxygen emanation from the surface of the bath is especially helpful in asthma and other respiratory troubles, and generally in all diseases amenable to radio-oxygen therapy.
12. The evidence points to the conclusion that the radio-oxygen bath has a prolonged, not a transitory, influence on troubles connected with the circulation.

This treatment can be carried out in any house where there is a bathroom; either as the radio-oxygen bath, or as the oxygen bath alone.

DISCUSSION.

Dr. N. S. FINZI (London) said that he had no experience of the radio-oxygen bath, but radium emanation in solution in the treatment of arthritis and chronic gout was certainly effective, especially in advanced and crippled conditions. He protested against the charges made by some makers for the hire of their radio-apparatus. In one case he calculated that the hire of an apparatus giving 10,000 Maché units yielded a return of 7,000 per cent. per annum to its maker. He thought also that makers of such apparatus should state the exact amount of its radium content.

Dr. G. E. BOWKER (Bath) asked whether the use of oxygen in the manner indicated would not displace the precious gases, such as "niton" or radium emanation, which Sir William Ramsay had found in considerable quantities in the waters of Bath. The oxygen would be obtained at the expense of the radio-activity. He questioned also whether some benefit was not derivable from the nitrogen in the gas, containing as it did a large amount of neon.

Professor E. RUTHERFORD (Manchester University) asked what definite evidence there was that the radio-activity was responsible for the benefits of the baths. It seemed to him that proof was lacking that the beneficial effect of the waters was due to radium. Had they ever eliminated the emanation from the water and then attempted to use the water therapeutically? In view of the advertisement which radio-active spas were receiving, the public had a right to know by definite experiments whether the effects of the Bath and Buxton waters were really connected with their radio-activity or were due to less sensational forces.

Dr. F. HERNAMAN-JOHNSON (Darlington) had seen good effects from radium water, particularly in neurasthenic cases, but in one case at least some amount of gastro-intestinal irritation afterwards occurred, although whether or not this was due to the treatment he could not say.

Dr. ARMSTRONG replied.

Memoranda:

MEDICAL, SURGICAL, OBSTETRICAL.

SUDDEN DEATH IN AORTIC STENOSIS.

H. W. R., aged 18, carter's boy, who had been apparently in perfect health and had never required medical attendance, dropped dead on May 13th. Death, which was quite instantaneous, was not preceded by a meal or any severe exertion. The only premonitory symptom seems to have been a transient syncopal attack about two hours before, from which he quickly recovered, going on with his work as usual.

The only lesion found *post mortem* was that the aortic valve segments were somewhat thickened and slightly nodular, but not seriously deformed or at all adherent to each other; the orifice would only admit the tip of the index finger. There was no evidence of regurgitation, and the valve held water quite well. The heart was not enlarged, and the muscle appeared quite healthy. There was no sign of any vegetations likely to cause embolism. It appeared that he had applied for entry as a stoker in the Royal Navy on April 10th, and was rejected. I wrote to the examining officer, Staff Surgeon Adrian Forrester, who reported that he had found a systolic murmur in the aortic area, and also in the mitral region, which could be heard outwards nearly to the mid-axillary line. The lad's physique and general health were good.

I think the case worthy of record, as aortic stenosis is not common at such an early age, and does not usually cause sudden death without previous symptoms. Moreover, there was a complete absence in the history of any previous rheumatism or illness of any kind. The amount of stenosis and alteration of the valve segments was quite slight, and did not appear sufficient to account for such a sudden syncope.

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British Medical Association.

CLINICAL AND SCIENTIFIC PROCEEDINGS.

HONG KONG AND CHINA BRANCH.

At a meeting of this Branch held on April 12th, Dr. C. Forsyth, President, in the chair, Lieutenant E. C. Lambkin, R.A.M.C., read a paper on *The Treatment of Syphilis by Salvarsan.* Referring to the great volume of literature constantly appearing on this subject, he pointed out the importance in the service in diminishing the duration of treatment and putting the patients on active duty in as short a time as possible. The number of cases dealt with was 33, only 30 of which he would refer to, as the 3 had only had one injection each in the course of the last week. The total number of injections was fifty-three. Some of the cases were in the earliest stage; some in the secondary and tertiary stages. The routine was to give an intravenous injection of 0.4 to 0.45 gram, and repeat the dose in three or four weeks, using an alkaline solution of the drug. In primary cases the chancre generally healed in eight days, and lesions about the mouth healed in four days. The process of healing was best described as "drying up." The method of preparation of the dose was described. For convenience three doses, or a multiple of three, were prepared at the same time, each dose measuring 300 c.cm., or about 10 fluid ounces. A wide bore short needle with finger rest was used, and the solution run in by aid of gravity in special apparatus. In only 3 cases had there been any severe reaction, the symptoms being headache, vomiting and pyrexia (temperature 103°), and restlessness. These symptoms appeared two or three hours after injection, and passed off before night. In each of these cases ordinary distilled water had been used, but since then the water had been redistilled a few hours before use, and no recurrence of symptoms of reaction had been noticed. Stress was laid on the precautions to ensure success—that the dose should not exceed 0.4 gram; it should be injected slowly, and plenty of liquid used; the reaction must not be acid. The average number of days in hospital in these cases was 17 days, and the average number of days for a similar set of cases treated with mercury alone was 41 days. Lieutenant Lambkin gave a summary of the latest scheme for treatment of cases of syphilis in the army, including examination of the blood for Wassermann's reaction at the outset, and at the end of three months. Lieutenant-Colonel Gordon Hall gave some of his experiences of using the drug in the early days of its introduction, when he treated 300 cases in Scotland both intramuscularly and intravenously, and referred to the danger of "encapsulation" of the drug preventing patients getting an adequate dose in the system at the time. Lieutenant Arthur drew attention to the fact that by intravenous method of administration the time taken was about half an hour, whereas by suspending the drug in prepared olive oil and injecting intramuscularly no encapsulation occurred, and the time required was only two and a half minutes for each case. Dr. Stedman gave his experiences with injecting with a syringe with a three-way stopcock as supplied by Down Bros., each injection taking about twenty to twenty-five minutes. Fleet Surgeon Stalkartt stated the routine in the Royal Naval Hospital at Plymouth, where, after finding a positive Wassermann reaction, an intravenous injection was followed by a second one in ten days, and the patient discharged. Dr. Martyn Lobb referred to the necessity for using the intramuscular injection in the out-patient departments of London hospitals, where there was not available accommodation to take the patients as in-patients. This plan had so far worked well at Guy's Hospital without any serious sequelae. Dr. Forsyth mentioned a case at present under his care which had so far resisted treatment with salvarsan. He thanked Lieutenant Lambkin for his most interesting paper.

The Honorary Secretary read a letter from Dr. Bell, the P.C.M.O., asking for an expression of opinion on a reported case of *Persistent catarrh and irritation of the nasal and bronchial mucous membrane*, which was attributed by the patient to be due to emanations from flowering privet on the hillside. Dr. Stedman, under whose treatment the case had been, said that he did not favour the view that privet was the direct cause. Other members were of opinion that there was not sufficient evidence to state that privet was the cause, and the Honorary Secretary was directed to reply to this effect.

Reports of Societies.

OXFORD OPHTHALMOLOGICAL CONGRESS.

Bright weather favoured the meeting of the Oxford Ophthalmological Congress held at Keble College, Oxford, on July 18th and 19th last. The programme was of an interesting nature, although perhaps a little crowded. It secured, at all events, a busy time for those who attended, many of whom came from overseas. American visitors included Dr. Miles Standish (Boston), Dr. H. F. Hansell (Philadelphia), Dr. W. B. Marple (New York), Dr. Andrews (Santa Barbara, Cal.), Dr. Green (Dayton, Ohio), and Dr. W. Likley Simpson (Memphis, Ten.). Canada was represented by Dr. Hanford McKee, of Montreal. From the Continent of Europe came Dr. H. Coppez (Brussels), Professor Straub (Amsterdam), Dr. Brandès (Antwerp), Dr. van Lint (Brussels), Dr. R. Liebrecht (Hamburg), Dr. Verrey (Lausanne), and others. In the Department of Human Anatomy and Physiology (kindly lent for the purpose by Professors Thomson and Gotch) addresses were delivered by Professor Straub, Dr. W. B. Marple, Dr. Hanford McKee, Dr. Thomson Henderson (Nottingham), and Dr. S. E. Whitnall (Oxford). All were distinguished by commendable brevity. The professional museum contained many objects of interest, chief among which were 250 paintings of the fundi of mammalian and reptilian eyes executed by Mr. A. W. Head. An album which contained photographs of the artist engaged in making sketches of the eyes of the cobra, the boa constrictor, and other fearsome animals excited no little amusement. The exhibits of Dr. H. S. Elworthy, of Ebbw Vale, call for a word of separate mention. They dealt mainly with geological specimens connected with mines and mining. Dr. Elworthy also showed various ingenious methods of measuring light below ground, as well as colour tests for estimating colour in mines. The commercial museum contained the latest things in the way of surgical instruments, optical appliances, microtomes, and so forth, exhibited by firms of good standing. The most interesting feature of this department was, perhaps, Gullstrand's demonstrating ophthalmoscope, an instrument whereby an image of the fundus oculi, singularly free from reflexes, can be readily obtained, even by an unskilled observer. A series of clinical cases was shown at the Eye Hospital. On July 19th an animated discussion on the nystagmus of miners, opened by Dr. T. Harrison Butler, of Leamington, took place at the Oxford Eye Hospital. Among the speakers may be mentioned the names of Dr. T. Llewellyn (Bargoed), Dr. J. Court (Staveley), Dr. H. S. Elworthy, Dr. H. Tomlin (Shirebrook), Mr. B. Cridland (Wolverhampton), Mr. J. J. Evans (Birmingham), Mr. R. J. Coulter (Newport), Mr. N. C. Ridley (Leicester), Mr. H. H. Folker (Hanley), Dr. S. McMurray (Stoke-upon-Trent), Dr. A. C. Norman (Sunderland), and Mr. Stanley Riseley (Sheffield). A resolution adopted was published in the Journal of August 10th, p. 331. The official dinner, held on July 18th, was presided over by the Warden of Keble College. Other social arrangements included a garden party at New College, and visits to the various colleges. Altogether the meeting was as instructive from the scientific as it was enjoyable from the social side.

The Baths Committee have recommended the Bath City Council to lease the whole of the bathing establishments and Roman remains to the Radium Development Syndicate, with which Sir William Ramsay is connected. It is proposed to give the syndicate the exclusive right to use and develop the mineral waters and to apply to Parliament for the necessary powers. On the other hand, the syndicate offers to spend a quarter of a million sterling upon the development of the baths.

Reviews.

THE MEDICAL SCHOOL OF TRINITY COLLEGE, DUBLIN.

AN account of the rise and development of the Medical School of Trinity College, Dublin, was given in the BRITISH MEDICAL JOURNAL of June 8th, 1912, p. 1305. In this work[1] Dr. KIRKPATRICK travels over the same ground, but, of course, much more thoroughly and in much greater detail. The book has evidently been compiled with the most scrupulous regard to accuracy. The author has had access to the college registers and to the documents connected with the school, and he has as far as possible acknowledged the sources of his information in the text and in the notes.

The foundation of Trinity College, the relation thereto of Trinity Hall, and the part played by Stearne in the development of the study of physic in Dublin, have already been told in the JOURNAL. Dr. Kirkpatrick gives brief biographical sketches of the most prominent men in the medical school from the seventeenth century to the present time. This gives the book a human interest, and makes the dry bones of history live. For instance, we are introduced to Dr. John Helsham, who was the first professor of natural and experimental philosophy in the college, and one of the original professors when the medical school was opened. He was afterwards Professor of Physic, and President of the College of Physicians. He was a member of the group of friends who used to meet at the house of Dr. Delany, among whom were Swift and Stella. Helsham was physician to Swift, who gives the following description of him in a letter to Pope, dated Dublin, February 13th, 1728–9:

> Here an ingenious good-humoured Physician, a fine gentleman, an excellent scholar, easy in his fortunes, kind to every Body, hath abundance of Friends, entertains them often and liberally. They pass the evening with him at cards, with plenty of good meat and wine, eight or a dozen together; he loves them all, and they him; he hath twenty of them at command. If one of them dies it is no more than Poor *Tom!* He geteth another or taketh up with the rest, and is no more moved than at the loss of his cat; he offendeth no Body, is easy with every Body—is not this the true happy man?

Swift elsewhere describes him as "the most eminent Physician of this city or Kingdom."

Another man who had much to do with the development of the school was George Cleghorn, who, in 1761, was appointed to the new office of Lecturer in Anatomy. The college had already an anatomical museum, to which, between 1730 and 1760, several interesting specimens were added. One of these was the skeleton of Cornelius Magrath, a giant, who during life had suffered from acromegaly, and died in 1760 at the age of 24. He was 7 ft. 8 in. high, and his hands are said to have been as large as a middling shoulder of mutton. An interesting circumstance connected with this giant is that he had for some time been under some kind of treatment at the hands of Bishop Berkeley, and it was afterwards stated that his great height was the result of experiments made upon him by the famous philosopher, who was curious to learn whether it was in the power of art to increase the human stature. The story of how his body was got for the college is worth telling. When Robert Robinson, who was Professor of Anatomy at the time, heard of the giant's death, he said to his class:

> Gentlemen,—I have been told that some of you in your zeal have contemplated the carrying off of the body. I most earnestly beg of you not to think of such a thing. But if you should be so carried away with your desire for knowledge that thus against my express wish you persist in doing so, I would have you remember that if you take only the body there is no law whereby you can be touched, but if you take so much as a rag or a stocking with it, it is a hanging matter.

Acting on this pretty broad hint, the students attended the wake, and drugged the mourners' whisky. When all were asleep the body was carried off to the college. Next morning the friends came to the Provost and indignantly demanded the return of the corpse. The Provost sent for Robinson, who assured him that so great was the diligence of the students that the body was already dissected. The authority for the story, Dr. Beatty, was told by his father, who had been a student at the time of the incident, that he met Robinson on his way from the Provost's house, and that he stopped at intervals chuckling to himself, "Divil a knife's in him yet!" Cleghorn was a Scot, and had been under the tuition of Alexander Monro at Edinburgh. He was one of the five students who founded the Royal Medical Society of Edinburgh. His influence gave a considerable impetus to the growth of the Dublin school. Of James Macartney, whose teaching of anatomy raised the number of students to an unprecedented height, some account was given in the article to which reference was made. We may quote an example of his characteristic outspokenness. When people's minds were agitated by the Burke and Hare murders, he said, in a letter to the papers:

> I do not think that the upper and middle class have understood the effects of their own conduct when they take part in impeding the progress of dissection. Nor does it seem wise to discountenance the practice by which many of them are supplied with artificial teeth and hair. Very many of the upper ranks carry in their mouths teeth which have been buried in the hospital fields.

A more conciliatory method of meeting the opposition was his offering his own body for dissection. He drew up a document to that effect and induced a number of notable persons besides himself to sign.

Clinical teaching was revolutionized by Robert James Graves, not only in Dublin, but elsewhere. Stokes and he made the Dublin school famous throughout the world. Of other names we need only mention those of Banks, Macalister, M'Dowel, Samuel Haughton, Robert William Smith, Edward Hallaran Bennett, which are sufficient to shed lustre on any school. The teaching staff of the present day is fully worthy of the reputation built up for the college by the labours of these men.

The history of all medical corporations and schools seems to be one of incessant wrangling over alleged rights and privileges, and every suggested reform or advance has been fought against to the last ditch. But for a few large-minded men here and there who see above and beyond the narrow interests of a particular corporation or school, progress would be made impossible by these jealous quarrels. Nowhere have these been more bitter than in Dublin, but nowhere has the victory of good sense over obstructiveness in the end been more decisive.

Dr. Kirkpatrick is admirably frank in his narrative, but his spirit is eminently fair and judicial, and he speaks without violence even when the occasion is sufficient to provoke strong language. He has traced the growth of the Dublin School of Physic from its humble origins through the many years that it had to struggle for life up to the present time, when it is recognized as one of the great centres of medical education. He has fully proved his contention that the title of the "Silent Sister" so often given to Trinity College is not justified in the case of the school of physic.

[1] *History of the Medical Teaching of Trinity College, Dublin, and of the School of Physic in Ireland.* By T. Percy C. Kirkpatrick, M.D., M.R.I.A., Fellow and Registrar of the Royal College of Physicians of Ireland. Dublin: Hana and Neale. 1912. (Med. 8vo, pp. 375; 3 illustrations. 7s. 6d. net.)

MICROSCOPIC ANATOMY.

THE new edition of *Quain's Anatomy*, which is being edited by Professors SCHÄFER, SYMINGTON, and BRYCE, has been enriched by the publication of *Microscopic Anatomy*, by Professor Schäfer.[2] It is rather an affectation to call this Part I of Vol. ii, for it is a book which contains 739 pages, 21 coloured plates, and 1,001 illustrations, which tell 1,001 tales—a volume in itself of most goodly proportions, and it stands as the most authoritative and best English textbook of histology.

The subject matter has been rearranged and rewritten, and a large number of new figures added. A number of the admirable coloured figures of human tissues and organs made by Professor Schotta have been reproduced by lithography. The wealth of beautiful illustrations adds enormously to the interest and value of the book.

The section on the vascular system has been contributed by Professor Gustave Mann, and contains much matter of interest. Thus, after reading the discussion of the origin of the lymphatics, we find, Professor Mann concludes:

> That lymph vessels grow out from the lymph-sacs, which are themselves originally formed from venous plexuses; they are

[2] *Quain's Elements of Anatomy.* Eleventh edition. Edited by E. A. Schäfer, J. Symington, and T. H. Bryce. In four volumes. Vol. ii, Part I: *Microscopic Anatomy.* By Professor E. A. Schäfer, LL.D., Sc.D., M.D., F.R.S. London: Longmans, Green, and Co. 1912. (Roy. 8vo, pp. 750; figs. 1,001, plates 21. 25s. net.)

in no way assisted in their formation by pre-existing peripheral tissue-clefts. . . . The balance of evidence appears to favour the view that the lymphatic system is a series of vessels lined by endothelium which arise from separated portions of veins and eventually again open into the venous system.

In dealing with the protoplasm of the cell, Professor Schäfer gives an excellent summary of Hardy's work on colloid suspensions. "We may," he says, "conceive cell protoplasm to be made up of infinitesimal particles of colloid material suspended in a watery solution of electrolytes, with which the colloid may enter into loose combination." These particles become aggregated or disaggregated by various agencies—electrical, chemical, or mechanical—and such aggregation determines structural and functional modification within the cytoplasm. "The proof that such changes do actually occur in urine was furnished by Greely, who showed that the protoplasm of protozoa exhibits structural changes during life in response to variations in temperature and chemical changes of the circumjacent fluid, as well as to the electrical current, which are strictly comparable to the changes described by Hardy in colloidal solutions." These changes are intimately associated with such vital manifestations as amoeboid and ciliary movement. An untouched photograph of a living leucocyte of triton is given, showing the reticular structure of the protoplasm. The warning as to the artefacts, which may be produced by the use of electrolytes as hardening and fixing reagent might have been put with advantage in heavy in place of small print. In regard to artefacts, we cannot help suspecting that the axon of nerve fibres is not a fibrillated structure, as figured and described by all histologists, but a homogeneous fluid substance which is fibrillated by the fixing reagents.

In the section on the blood we find that Professor Schäfer regards the blood platelets as minute cells, and not as product of burst red corpuscles or chemical precipitates from the plasma. In his discussion on the islets of Langerhans, he concludes in favour of the view that they are a separate kind of tissue, and not a stage in the life of the ordinary alveolar tissue of the pancreas. We note some interesting delineations of the pancreatic cells before and after provocation of the secretion by application of acid to the mucous membrane of the duodenum.

We can recommend this volume strongly to any one who wants a more extensive knowledge than that given in Professor Schäfer's *Essentials of Histology*. To turn over the pages and look at the beautiful figures is an education in itself, and must give pleasure to any one who wants to extend, or merely to refresh, his knowledge of the minute anatomy of the body.

TEXTBOOKS OF DISEASES OF CHILDREN.

IN DR. REGINALD MILLER'S book, the *Medical Diseases of Children*,[3] an immense amount of information is packed into a relatively small space. No matter of importance appears to have been omitted, and the book, on this ground alone, is worthy of commendation. The author calls special attention to the fact that in the section on infectious diseases he has in some instances classified the infective processes according to the infective organisms. In the stage to which bacteriology has at present reached, such an arrangement is not free from some practical disadvantages. In any case it is not always possible at the outset to know the particular organism responsible; such a knowledge, indeed, is ordinarily only obtained after other details have been investigated and settled. Again, the symptoms which infection of any organ by one of several bacteria may produce may be clinically so nearly identical that only bacteriological examination can decide. In empyema, for example, the early symptoms at least may be practically the same with the pneumococcus, the staphylococcus, the streptococcus, or even the *Bacillus coli*. The nature of the infecting organism may only be determined by an investigation of the pus. The time may come when a bacterial basis of classification will be advantageous in a textbook, but it can hardly be said yet to have arrived. In his chapter on pneumococcal infections Dr. Miller is reduced to the clumsy term "pneumococcal pneumonia" when dealing with the lung affections due to the invasion of the pneumococcus. This pneumococcal pneumonia, according to the author, includes the types that are ordinarily known as "lobar pneumonia" and "primary bronchopneumonia." He states that much of the difference of opinion that has arisen as to the proportional frequency of lobar and lobular pneumonias in infancy is due to an insufficient recognition of the primary type of bronchopneumonia. Now, it may be said that, in spite of the able advocacy of Dr. West, only a small minority of authorities on children's diseases accept the reality of this primary bronchopneumonia, and most of those who might admit its occasional occurrence would deny the frequency the author ascribes to it. The *post-mortem* evidence he alludes to is insufficient to prove his contention and is open to a different interpretation. Bronchopneumonia, or, as the author prefers to call it, "consecutive or post-bronchitic pneumonia," is relegated to a much later section of the work, that on diseases of the respiratory system; but the author is obliged to admit that "a small proportion" of such pneumonias are due to the pneumococcus; whether the opinion as to the infrequency of the pneumococcus in such conditions be correct or not, and it is open to doubt, the dislocation illustrates the point made above as to the inconveniences that attend a bacterial classification. In the chapter on "the rheumatic infections," he writes: "We must here take for granted that rheumatism is a bacterial disease, a point admitted on practically all sides." The acceptance of the bacterial origin of rheumatism is not perhaps so universal as the author supposes, despite the excellent work of Poynton, Paine, Carey Coombs, and others. In treating of rheumatic subcutaneous nodules, he mentions a haemorrhagic form which appears over the bony prominences of the back. Here a reference might have been given to some place where a fuller description of such nodules is to be found; they must be unknown to many well acquainted with subcutaneous nodules of the ordinary types. As to the haemorrhagic forms of arthritis, pericarditis, and pleurisy which the author associates with haemorrhagic nodules, incontrovertible evidence should be produced before their purely rheumatic origin is accepted. That a large percentage, perhaps a majority, of cases of chorea are associated with symptoms of a rheumatic order will not be disputed, but this does not seem sufficient justification for placing chorea amongst the rheumatic infections, for the question whether rheumatism is the sole and only cause of chorea does not, as the author agrees, "admit of an absolutely certain answer." The ordinary conception of what constitutes chorea, too, will have to be extended if "latent chorea" be accepted as an appropriate designation for all the nervous symptoms the author includes under it. The work is well got up, and the very numerous small photographs are a valuable and helpful addition to the text.

DR. KASSOWITZ, in his *Praktische Kinderheilkunde*,[4] has supplied a very interesting volume on the diseases of children. In the course of the thirty-six lectures it contains, the whole ground from the medical side is well covered, and the style is readable and interesting. The book differs materially from the ordinary textbook, because, as the author states in his preface, he does not always find himself able to swim with the stream in matters of opinion. As we read the lectures we have little doubt that he loves an argument for its own sake, and the passages in which he defends his own excursions against the stream are ably written and are amongst the most interesting in the book. It is hard work to fight against established opinion, and we do not think that Dr. Kassowitz has much chance of seeing his views either on infant feeding or on the treatment of diphtheria gain general acceptance, but as he writes from a vast clinical experience, his suggestions cannot but be provocative of thought, and it may well be that opinion will move in his direction even if it never travels all the way with him. He is a determined advocate of the system of giving to children from the earliest weeks only five meals in twenty-four hours. Clinically he finds that on

[3] *The Medical Diseases of Children.* By Reginald Miller, M.D.Lond., M.R.C.P., Physician to Out-patients, Paddington Green Children's Hospital, Assistant Physician to Out-patients, St. Mary's Hospital, late Medical Registrar and Pathologist, Hospital for Sick Children, Great Ormond Street. Bristol and London: John Wright and Sons, Limited; Simpkin, Marshall, Hamilton, Kent, and Co., Limited. 1911. (8vo, pp. 555; 98 figs. 12s. 6d. net.)

[4] *Praktische Kinderheilkunde in 36 Vorlesungen für Studierende und Aerzte.* Von Professor Dr. M. Kassowitz. Berlin: Julius Springer. (Sup. roy. 8vo, pp. 664; 44 illustrations. M. 18.)

this system the babies put on weight more quickly and are much less subject to nutritional disturbances than on the more ordinary system; these effects, he states, are very clearly seen in institutions where it can be tried on a large scale. A minor advantage of the method is that mothers are more easily persuaded to suckle their babies when fewer feeds are demanded. With regard to cow's milk, he recommends a dilution with an equal part of water for the first six to eight weeks, but never more. Indeed, the five-meal-a-day system obviously makes too great dilution of the milk impossible. The author gives a testimonial to condensed sweetened milk as an infant food where no safe supply of cow's milk is available, and he has in former years seen infants fed, for the first six months of life, only on such foods without the production of rickets. He strongly opposes the too early adoption of a so-called strengthening diet; meat juices and eggs he considers harmful until nearly the end of the third half-year, and in many cases unnecessary until the end of the second year. In this connexion he quotes Voit's opinion that protein can be added to the body more readily by a diet containing a medium quantity of protein and much non-nitrogenous food than by a large quantity of protein and little non-nitrogenous food. Many English workers will agree with the author's view as to the harmfulness of alcohol for children, even in such diseases as infantile diarrhoea, in which it has been most widely employed. Three of the lectures deal with rickets, one of them with the author's well-known theory of causation. He altogether discards the view that the disease is caused by digestive abnormalities or diminution in the quantity of lime salts, and holds that it is due to irritation by poisons which enter the body through the respiratory tract. The well-marked seasonal curve, the occurrence of rickets even in breast-fed infants if they are kept in stuffy rooms with hermetically closed windows, the improvement which follows when they are taken into the open air, and the prevalence of rickets amongst animals in confinement, are the main facts which suggest the respiratory tract as the way of entrance of the poison. With such a theory of causation treatment by diet becomes useless. The author's belief in phosphorus given in small doses as a specific in the treatment of rickets is also well known, and this volume brings out clearly the large mass of experience upon which his opinion is based. When as many as 10,000 children with rickets come for treatment yearly at the clinic, often from considerable distances, there can be no doubt as to the faith which the system inspires. He will have nothing to do with any remains of a belief that dentition is the cause of symptoms such as diarrhoea, over-excitability, cough, or convulsions which may occur coincidentally with it; and he would have members of the profession stand firmly against the theory, which undoubtedly dies hard. A very large part of the book is given up to the infectious fevers, beginning with a chapter dealing generally with questions of incubation and immunity. He recommends not school but class closure for a week for any case of scarlet fever.

Dr. HERMAN B. SHEFFIELD, of New York, in *Modern Diagnosis and Treatment of Diseases of Children*,[5] has added another to the large number of textbooks upon the diseases of children for students and for practitioners of medicine. We are not sure that we share the author's views as to the unsatisfactory nature of the textbooks already in existence, or believe that it is possible within the space of 600 pages to traverse by any new route the whole ground of medicine and surgery in their relation to children's diseases. In the preface we are told that—

> the time-worn, stereotyped, verbatim quotations of different authors and the customary over-abundance of illustrations of fads and fancies of enterprising tradesmen—which so conveniently help to "pad" a great many of our textbooks—have been eliminated.

Now, while we cannot agree that such a description fits a very large number of excellent textbooks in the English language, at the same time we gladly acknowledge that the author has succeeded in condensing a very large amount of information into a comparatively small compass. The book contains some reference to almost every diseased condition which has been met with in children, and special chapters are devoted to physical diagnosis and semeiology, general and special therapeutics, congenital malformations and mental diseases, while the whole is illustrated by no fewer than 207 illustrations. With so much attempted and so little space at the author's disposal, it is not surprising that in some instances that which is rare or of less importance seems to have obtained an undue prominence at the expense of that which is of great and common interest. Where the subject of empyema is dismissed in a few paragraphs it seems unnecessary to find room for two photographs, each occupying the greater part of a page, of the condition of the thoracic and abdominal organs. On the whole, however, the author has been remarkably successful in avoiding such discrepancies, and the great majority of the illustrations, especially those to which Dr. Sheffield's own name is attached, are well chosen and of great service to the text. The book is written with vigour, although in a style to which in England we are, perhaps, less used than in America. "Verily," the author exclaims in a final outburst, "considering the baleful acts of omission and commission in infant feeding, one is amazed by the ever-swelling hordes of youthful humanity that have apparently escaped the clutches of ignorance—and death. Merciful Nature!" The author's teaching in a few instances is unusual, but on the whole it is clear and sound, while the recommendations as to treatment are comparatively full, and prescriptions are given both in the metric system and in the system in vogue in this country.

The second edition of the textbook of *Diseases of Infants and Children*,[6] by Dr. CHAPIN and Dr. PISEK, of New York, retains in all essentials the characters of the first. The plan of the book is that which is followed in a very large number of manuals dealing with the same subject. Special features are the inclusion of articles upon "special examinations," the "signs of illness in infancy," and on "the commoner surgical diseases." The book, as a whole, maintains a high standard, and is well written. It is profusely illustrated with photographs, most of which are well reproduced. The colour prints, however, illustrating the varieties of rash in the exanthemata are crude, and can be of little value. The chapter upon breast-feeding is perhaps the least satisfactory. It fails to indicate how closely the supply of milk, in the first weeks of lactation, depends upon the physiological stimulus of the vigorous sucking of the child. It is recommended that during the first few weeks of life, when the nursing mother has little milk, a small amount of food may be given from the bottle immediately after nursing, a practice which is only too liable to defeat its own object, and result in the insufficient development of lactation. Again, it is recommended to give one bottle a day to every nursing infant from the third month onward, so that it shall be trained to its use. The principles of substitute feeding are well and fully explained. In the treatment of intussusception an attempt at reduction by fluid injection is recommended. There is no mention of the frequency with which oedema occurs in children, apart from nephritis, in chronic alimentary disorders, or in general miliary tuberculosis.

The new edition of CARPENTER'S *Golden Rules for Diseases of Children*,[7] edited by Dr. Bellingham Smith, can be carried in the waistcoat pocket. The amount of knowledge that can be condensed into a work of the size is necessarily very limited. Still, that it has reached a fourth edition is some proof that it has been of service to many. In this edition the section on skin diseases has been omitted, thus allowing of some expansion of others. Although the amount of information on each complaint is scanty, yet the various items included would seem to have been selected with care and skill. The little work will prove of the greater service the more it induces its readers to consult the larger and more adequate treatises.

[5] *Modern Diagnosis and Treatment of Diseases in Children.* By H. B. Sheffield, M.D. Philadelphia: F. A. Davies and Co. London: S. Phillips. 1911. (Roy. 8vo, pp. 631; figs. 207. 19s. net.)

[6] *Diseases of Infants and Children.* By H. D. Chapin, A.M., M.D., and G. R. Pisek, M.D. Second edition. London: Baillière, Tindall and Cox. 1912. (Royal 8vo, pp. 657; figs. 183. 18s. net.)

[7] *Golden Rules for Diseases of Infants and Children.* By George Carpenter, M.D. Golden Rules Series, No. XI. Fourth edition. Revised and partly rewritten by E. Bellingham Smith, M.D., B.S. Bristol: John Wright and Sons, Limited. 1910. (Demy 32mo, pp. 124. 1s.)

NOTES ON BOOKS.

NEARLY eighteen years have passed since the first publication of *Wheeler's Handbook of Medicine*,[1] and in the fourth edition, which has now appeared, little remains of Wheeler's own writing. This volume, like its immediate predecessor, has been prepared by Dr. W. R. JACK of the Western Infirmary, Glasgow. Though the ground covered has been extended (articles on tropical diseases, immunity, and the various intoxications being now included) Wheeler's desire to correlate symptoms with anatomy and physiology seems to have been kept in mind. In effect, it is a volume midway between a cram-book and a treatise, and being an excellent specimen of its kind may be found useful not only by students, but by practitioners whose library does not include a thoroughly modern treatise on medicine.

In the preface to the first edition of his book on impotence in the male Dr. ORLOWSKI gave as his reason for adding to the literature of the subject a desire to emphasize the importance of hypertrophy of the colliculus in the pathology of impotence, and the value of cauterization in its treatment. The second and enlarged edition[2] is dedicated to the memory of Tallemand, whose work, the author states, was unknown to him when his first edition was published in 1907. Besides the causes, diagnosis, and treatment of "colliculitis," the anatomy and physiology of the male generative organs, the several forms of impotence, and sexual neurasthenia are dealt with, and there is also a short chapter on male sterility.

The third edition of Dr. CHALMERS MITCHELL'S *Outlines of Biology*[3] has been revised and supplemented by Mr. G. P. MUDGE. Many chapters are new, others have been either rewritten or amplified, and the number of illustrations has been largely increased. The histology of the animal tissues is dealt with in a more detailed manner than formerly. Problems relating to adaptation and inheritance are lightly touched upon. As an elementary textbook it is of value to the medical student, but it is to be hoped that if new editions are called for the process of amplification will not be further continued. Primarily intended for candidates preparing for the first examination of the Conjoint Board, the preface tells us that "in large measure it will also meet the requirements of students preparing for other examinations, such as the First Medical of London University and of Durham University." This may be true, but it seems unnecessary for even such students to learn the facts of "tigroid bodies," "neurochondria," and the "reticulum of Golgi," to mention but a few cases. This is surely overloading the work required from a first year's student. This tendency to "stiffening up" should not be continued indefinitely. Professional biologists must learn to discriminate between the amount of biological knowledge required from medical students in their first and third years, and between medical students and those who intend to become professors of pure science. The present edition, though overloaded in parts with too much detail, is in other respects quite useful. It can with confidence be recommended to a student.

The science of eugenics seems to possess a curious fascination for many of our latter-day novelists. In his new book *The Hidden Fear*[4] Mr. JAMES BLYTH has chosen as his theme the possibility of the transmission of insanity from father to child, a theory which nearly wrecks the happiness of his heroine and her lover, a genteelly diabolical baronet. How Winifred, the enthusiastic pupil of an eccentric professor who believes madness to be caused by the presence of certain bacilli in the blood, is released from her self-imposed celibacy it would be hardly fair to relate. It suffices to say that the professor's theory collapses at the crucial moment, and the "hidden fear" vanishes before the sound of wedding bells. The book seems more or less of a pretext for the airing of Mr. Blyth's views on vivisection and the treatment of lunatics; but the interest of the story is well sustained, and the character of the conscientious heroine is well worked out.

[1] *Wheeler's Handbook of Medicine.* By William R. Jack, B.Sc., M.D. Fourth edition. Edinburgh: E. and S. Livingstone. 1912. (Cr. 8vo, pp. 542; figs. 25. 8s. net).

[2] *Die Impotenz des Mannes.* Von Dr. P. Orlowski, Berlin. Zweite Auflage. Würzburg: C. Kabitzsch. (Roy. 8vo, pp. 168; 22 figures in the text; 3 coloured plates. M. 4.50.)

[3] *Outlines of Biology.* By P. Chalmers Mitchell, F.R.S., LL.D., F.L.S. Revised and supplemented by Geo. P. Mudge, A.R.C.S. Third edition. London: Methuen and Co. Ltd. 1911. (Post 8vo, pp. 362; figs. 74, plates 11. 6s. net.)

[4] *The Hidden Fear.* A Novel, by James Blyth. London: F. V. White and Co., Ltd. 1912. (Post 8vo, pp. 311. 6s.).

Nova et Vetera.

THE CHARITABLE PHYSITIAN.

IF the happiness of a medical author be measured by the rapidity with which editions of his work are demanded, Philbert Guybert, Escuyer, Docteur Regent en la Faculté de Médecine à Paris, surely achieved felicity. His tract, *Le Médecin Charitable*, which gave a friendly byname to the author himself, was first issued about 1623, and sold for one or two sous, but by the extensions successively demanded it was so "revised, corrected, and augmented" by the author, that before his death in 1633 it had expanded into a volume of more than five hundred pages, under the title, *Toutes les Oeuvres Charitables de Philbert Guybert.* An English edition,[1] confined to the matter of the earlier French issues, appeared in 1639, and a Latin version of the whole was published in 1649. The title page of the Latin edition tells us that it had already a hundred French editions, and fresh reprints continued to appear for many years subsequently not only in Paris, but in Lyons, Rouen, and Troyes. This popularity was a sign of the times rather than a warrant of intrinsic merit, and is only intelligible when we recall the circumstances of the medical Paris of that period.

The population of Paris in the seventeenth century numbered about half a million. At the head of its medical service were fully a hundred physicians, incorporated in the Faculty of Medicine, and endowed with the privilege of practice in Paris. Raw drugs, imported by the épiciers, were prepared, compounded, and administered by the apothecaries, who formed a higher branch of the same guild, and who had a considerable financial interest both in the polypharmaceutical marvels of the Arab materia medica and in the newer inorganic remedies which the recent development of chemistry was placing at the disposal of the enterprising physician. Between prescribing and administering treatment was a debated territory which led to constant controversy between the different medical corporations, and the lawyers, the Parliament of Paris, were frequently called in to adjudicate on various claims advanced by one or other party. In 1622 a decision of this kind had emphasized the authority of the Faculty over the apothecaries by enjoining that in their inspection of the shops of the guild members the authorities of the apothecaries should be accompanied by two doctors, professors of pharmacy. Ten years later the apothecaries were again worsted by a decree which allowed the épiciers to keep not only simple drugs, but the well known compositions, mithridate, theriac, alkermes, and hyacinth.

The apothecaries had evoked the resentment of the Faculty not only by direct resistance to its authority but by overt association with those physicians from schools outside Paris who made a direct attack on the monopoly of its practice. At this time the attack centred in the bureau of Theophrastus Renaudot, with regard to whom it is difficult to decide whether he was really a charlatan or merely an innovator. Renaudot, who had graduated in Montpellier, settled in Paris in 1612 under the protection of Richelieu and with a nominal appointment as physician to Louis XIII. He set up the first *bureau d'adresse*, a registry office for servants, houses, and other things of exchange, and this rapidly developed into a great establishment by the addition of a loan office and charitable consultations for the poor which a system of treatment by correspondence extended to the absent. In 1631 he became the first journalist of the *Gazette*, which gave him his nickname, "Le Gazetier," and with a supplement which was often devoted to the praise of antimony he was the pioneer of medical journalism. The students of the Faculty, unknown to their masters, frequented his consultations, and he fitted up a chemical laboratory and rallied the apothecaries round him. His success in these enterprises was so great that Richelieu made him "Commissaire général des pauvres, maitre et intendant général des bureaux d'adresse de France" and "Historiographe de la couronne." After the death of Richelieu in 1642, Renaudot's success was changed to defeat, and the Faculty

[1] *The Charitable Physitian, with the Charitable Apothicary.* Written in French by Philbert Guibert, and by him, after many severall editions, reviewed, corrected, amended, and augmented, and now faithfully translated into English for the benefit of the Kingdome. By I. W. London: T. Harper. 1639.

pushed far its triumphs against him and all who had art or part in his enterprises.

Therapy also was at the time a source of bitter controversies. Within the Faculty there was a strong movement away from the Arabian pharmacy, with its grapeshot of mithridate and theriac, and its magic of bezoar and alkermes and hyacinth, toward a simpler system based on purgation, by bleeding and clyster and senna, and though some of the less orthodox members were coquetting with the newer chemical remedies, especially with antimony as a vomitory, the majority found in the simple pharmacy the opportunity of dealing a subtle blow at the apothecaries by teaching the patients to prepare the remedies for themselves. It was with an informally avowed approval of the Faculty that Guybert issued *Le Médecin Charitable*, in which the directions for a domestic pharmacy were carefully laid down. Of its efficacy as against the apothecaries we get a vivid picture from Guy Patin who refers to it time and again. Writing to Spon in 1649 he says, "If you would hinder the apothecaries of your town trying on anything against you, you must remind them of the *Médecin Charitable* with which while it cost but a sou or two we have ruined the apothecaries of Paris. . . . I may say in all truth that they should not take apprentices, their trade being so dry that no one now cares to touch it. . . . The people of Paris are so accustomed to this economy that it is not the apothecary they now call in, they send at once for the physician, and although from the poverty of the time there are some who do not pay at all well we have at least this advantage that we are called first."

Le Médecin Charitable gives somewhat over a hundred receipts, of which a full third are for purgatives in one form or other. After fifteen purgative clysters we note with interest three nutritives. That for the poor reads, "Take a chopin of good milk boiled with two ounces of good white sugar and mix in the yolks of two eggs." The tale of purgatives is quickly resumed in suppositories and laxative soups and ptisanes. Senna is the backbone of this materia medica, and as it was often falsified by other leaves, "bon sené" is always mentioned. The price of the best senna was 40 sous a pound. Suppositories were prepared from 2 oz. of common honey, boiled to the consistency of a solid electuary. This, after adding a little salt, was poured on greased paper and rolled with the oiled hand into a suppository "of the size of the ring finger and six or seven fingerbreadths long for adults and three or four for the young." In the English edition this direction as to size is omitted, and we might infer that the English physician of the time was less anxious than his French colleague to maintain the *mens conscia recti* were it not that various other abbreviations and divergences, such as "water" for "*vin blanc*," suggest an explanation arising out of the difficulties that always face the faithful translator. Pessaries of cotton, silk, linen, or carded wool, impregnated with drugs and enveloped in smooth linen, were soaked in water, wine, juice, or suitable liquid. *Pour provoquer les mois*, they were prepared from mercurialis, and, to arrest them, from knotgrass, plantain, cinquefoil, and other herbs.

Injections were used for various purposes, those for acute gonorrhoea, of whey or barley water, or, where there was pain, freshly drawn cow's milk, being on the lines of the best treatment of that affection prior to the antiseptic era. Various compresses and other remedies are described, sleep being secured by taking eight or ten lettuces or five or six handfuls of vine leaves or poppy heads and making a decoction with which for a quarter or half an hour the legs and feet were washed, beginning with the legs. The tract closes with a list of the necessary instruments, including two syringes, each with its large and small nozzles, of ivory for the household, and of box for lending to the poor. For the apothecary the sting of *Le Médecin Charitable* lay not so much in the revealing of his formulas as in giving the cost of each preparation in a marginal note. In the price list of medicines which soon followed, the cost of the fire is charged as well as the price of the drugs; but small store was set by the skill of the trained pharmacist, though the poor man had to serve ten years before he could open shop for himself. This price list, which was the first supplement Guybert was called on to issue, gives a catalogue of about two hundred simples and many compounds. The pound used contains 16 oz., and the drachm 72 grains. Bezoar is most costly, its price being 24 livres an ounce, and it alone is honoured by an annotation. This reads: "The grain does not come to a sou and is no use; it is a pure abuse." In the English edition the price of bezoar is £2 10s. Civet and fine musk are quoted per drachm at 50 sous, while the finest rhubarb and hypocistis cost respectively 45 and 50 livres a pound. Fragments of precious stone, amethyst, emerald, and even the renowned hyacinth, needed for the electuary of gems, were cheap, costing from 8 to 10 sous an ounce.

Two years after the first appearance of *Le Médecin Charitable*, a much more elaborate treatise on the procedures of pharmacy was issued with the title *L'Apotiquaire Charitable*, and afterwards two special tracts on the preparation of jellies and of confections. From these we

mention only the change in the signification of blanc manger, which was made from capon, hen and calf's foot, of which the jelly was mixed with white breadcrumb and sweet almonds, infused and strained. In the English edition the first three tracts are translated along with a tract on embalming, with which Guybert completed his personal work, leaving the poor apothecary little hold on the citizens of Paris either alive or dead. The preface to *L'Apotiquaire* says that *Le Médecin* had been well received, not only in France but among foreigners, who had turned it into their tongues for the good of their nation, but the English and Latin versions alone have here been accessible.

The acceptance accorded to the initial efforts of Guybert encouraged him not only to develop his original plan as we have seen, but to extend it by ancillary treatises. Several of these were reprints, such as those of Mizauld on senna and on the medication of fruit trees, and also Alain's tract on plague, which had been issued in 1606, and Savot's translation of Galen on bleeding. These were brought up to date by annotation. Gui Patin wrote a tract on the conservation of health, which was added in the seventeenth edition; of it he says to Spon (November 11th, 1644): "I wonder who could have said to you that I was the author of the little tract on the Conservation of Health which is appended to the Charitable Physician; it is not worth your looking at. I prepared it some time ago at the request of the worthy Charitable Physician himself M. Guybert, who had capped me and who asked me to make it as popular as I could so that he might add it to his book. . . . If I can ever find leisure I shall try to revise the tract and make it a little better than it is; meantime, I pray you, do me the charity to say to no one that I wrote it for I am ashamed of it myself." Patin also wrote the annotations, and we may suspect that his energies were engaged less from loyalty to his senior than from love of a fight with his "chers ennemis," the apothecaries of Paris.

The ancillary tracts contain many points of interest, of which, to avoid too wide divergence from the main theme, only two will be quoted. In the tract on plague two antidotes are recommended—wine, "which by its subtility passes easily, and by its strength restores promptly the spirits, comforts the heart and other noble parts"; and the "electuary of the three adverbs" *cito, longe, tarde*, which may be Englished with verbs as *wend wide*, and *wait*—that is, get away as soon as you can, go as far as you can, and stay away as long as you can. Mizauld's tract on an "Agreeable method and easy to have fruits, etc., which purge gently and kindly, and by means of which one may give remedies in various diseases without difficulty and without disgust," contains one piquant quotation from Jean Lang, against fruit thieves. "I have never," he says, "known cantharides serve better than if you put the powder in apples, plums, figs, peaches, and other fine fruits on the bushes, drawing back the skin and then closing it over the powder so that it is not noticeable; for when the thieves steal the fruit and eat it, they have such pain and difficulty that it reveals their pilfering, and is like a just punishment of their misdeeds." Humour in making the punishment fit the crime finds a worthy prototype in this agreeable method and easy of medicining plants and fruits. There is an engraved portrait of Guybert in the Latin edition, of which there is a copy in the Library of the Royal College of Surgeons of England, which also possesses a copy of the English edition, typographically more interesting than the others.

R. C. B.

THE West London Hospital has received an anonymous donation of £3,000.

THE papers prepared for the first International Eugenics Congress, held in London last week, were printed beforehand, with an English translation of those written in other languages, and were issued in a volume for the use of the members of the Congress. This volume has now been placed on sale. The volume is entitled *Problems in Eugenics*, and is published by the Eugenics Education Society, 6, York Buildings, Adelphi, W.C. Price 8s. 6d. net. Two pamphlets, one consisting of abstracts of papers read and the other a catalogue of the exhibition, have also been placed on sale. These pamphlets are published at the same address, price 1s. each.

THE RELATIONS OF PHYSICIAN, PHARMACIST, AND PATIENT.

SOME important ethical questions are discussed by Mr. J. Rutherford Hill in a paper read during the recent British Pharmaceutical Conference at Edinburgh. For the purposes of the argument the complete separation of the functions of the prescriber and the dispenser is assumed as the ideal arrangement, the dispensing physician and the prescribing pharmacist being left out of account, and the main points made may be summarized as follows:

The right of the prescriber to suggest to his patient the name of a dispenser, or to object to one mentioned by the patient, is conceded on condition that it is exercised with regard solely to the interests of the patient and not in a spirit of mere favouritism or personal predilection. Any attempt to coerce the patient by means of private formulae or code prescriptions to resort to a particular pharmacist is condemned, as also, of course, any corrupt agreement or understanding between prescriber and dispenser. The practice of leaving the patient free to choose any dispenser he may prefer is extolled as, wherever practicable, the one to be adopted in the interest of all parties concerned.

In illustration of the obligation of the prescriber to refrain from hasty or ill-judged criticism of the work of the dispenser, Mr. Hill cited the case of a physician who condemned a silver nitrate lotion because, on dilution with tap water, it did not become milky. The lotion, condemned in the hearing of the patient, was in the event proved by the dispenser to be correct, the failure to become noticeably milky on dilution being due to the smallness of the percentage of chlorine in the tap water. The prescriber, therefore, found himself in the unpleasant position of having to apologize to the pharmacist, and to explain to the patient that his own strictures had been without justification. It is pointed out that, had the prescriber given the dispenser the chance to justify his work before condemning it to the patient, he would have acted more wisely as well as more conformably to the golden rule. Another case recorded by Mr. Hill is an instructive example of the kind of relations between prescriber and dispenser which are to be sedulously avoided. Damages were claimed by a pharmacist against a physician who had alleged wrong dispensing of a prescription in terms amounting to a criminal charge. In the court of first instance the claim of the dispenser was disallowed on the ground of privilege. On appeal the judgement was reversed, the court ruling that, while the prescriber has a certain right and duty to see that his patient obtains the proper medicine, there is no relationship of contract between prescriber and dispenser, and no privilege similar to that between master and servant can be claimed. Substantial damages were awarded to the pharmacist on the ground of slander.

In discussing the question of the ownership of prescriptions, Mr. Hill indicates two evils arising out of the prevalent custom of leaving them at the free disposal of patients. In the first place, as we all know, prescriptions are handed from one friend to another supposed to be suffering from the same ailment. This may be an injury to the friend, and is an obvious injustice to the prescriber. In the second place, a prescription may be dispensed an indefinite number of times, which is not only unfair to the medical practitioner but often disastrous to the patient. Mr. Hill suggests that this is a matter for conference and arrangement between prescribers and dispensers. Another point of some importance in Mr. Hill's paper is the stress laid on the confidential nature of the prescription. Thus, a pharmacist is not, in his opinion, at liberty to answer questions asked by the patient or his friends as to the ingredients of a given medicine or the malady for which it is prescribed; still less to criticize its appropriateness or to suggest anything he may consider better. Any knowledge which comes to the dispenser in his professional capacity is to be regarded as confidential, and under no circumstances to be divulged.

The practice of exploiting a physician's prescription by recommending it to others is very rightly and strongly condemned. Nor is a dispenser at liberty to give a copy even to the patient himself, except when the prescriber is inaccessible for the time being, or under circumstances which he may be expected to approve.

It must happen sometimes that a pharmacist has a

prescription brought to him which irresistibly suggests to his mind that some oversight has occurred on the part of the prescriber. The ingredients may be incompatible, the dose dangerous, or the directions absurd. Mr. Hill insists that no sign of any such difficulty must be given to the patient. Wherever possible the prescriber should at once be referred to, and the telephone will in many cases afford an obvious solution of the problem. Any deviation from the exact terms of the prescription, made on his own account by the dispenser, should at once be reported by him to the prescriber. This rule, of course, applies not merely to alterations made by way of correcting a presumed error on the part of the prescriber, but also to any substitution that on emergency may be unavoidable on account of the absence from the dispenser's stock of some ingredient of a given prescription.

In his penultimate paragraphs the writer, in emphasizing the duty of his colleagues to supply the articles prescribed in their highest quality, purity, and potency, points out that the maintenance of the principle of purity in medicine is one of the prime objects of the British Pharmaceutical Conference, and suggests the advisability of its exercising the disciplinary powers which this article implies. He further observes that the Pharmaceutical Society, despite the statutory powers at its disposal, at present possesses no adequate disciplinary control over its members in relation to most of the points to which he calls attention.

Medical readers will not fail to sympathize with Mr. Hill and his colleagues of the British Pharmaceutical Conference in their desire to formulate and render fully effective the ethical principles conducive to the highest interests of their art and the dignity of their calling. Nor do we think that many will take exception to the spirit or, indeed, the details of Mr. Hill's interpretation of the mutual responsibilities of the physician, the pharmacist, and the patient. The objections to the indefinite repetition of a given prescription and the dangers attending such a course are dealt with in a letter, published elsewhere in this issue, from a pharmacist who suggests that a prescription should bear a distinct statement forbidding repetition without a further order. The objections and risks might be minimized by the addition of words indicating a date beyond which its dispensing was not authorized by the prescriber.

LITERARY NOTES.

The August number of the *Arena* well maintains the deserved reputation which this magazine has already won for itself. Among the articles of special interest is one on the chapel windows at King's College, Cambridge, by Mr. A. Hamilton Thompson; another on the Chamonix Aiguilles, by Mr. George D. Abraham, a recognized authority on mountaineering, is especially remarkable owing to the beauty of the reproductions of photographs taken on the spot by the author. There is an illustrated article on Rossall School, while other articles particularly likely to interest readers who are connected with the public schools are "Public Schools at the Range," and "Lawn Tennis at the Public Schools." There is a very racy article on "Reminiscences of Oxford Journalism" by a former editor of *The Isis*. "The Tonbridge School Mission" is the first of a series of brief articles dealing with the social service work of the public schools.

Now that the study of entomology has come to have such a direct bearing on the causation of disease, it may not be out of place to call the attention of our readers to a work entitled *Genera Insectorum*, published by a committee of entomologists, under the editorship of P. Wytsman. Since the days of Linnaeus, but especially since 1850, most of the orders of insects have been minutely studied by specialists, whose labours are buried in a multitude of monographs, reviews, and so forth. These works being generally published in the transactions and annals of scientific societies of various countries and in different languages, are so scattered that they are practically inaccessible in large part to the majority of students. The object of the publication is to consolidate in one work in a condensed form all these scattered contributions. Each family of insects is dealt with separately in a distinct fasciculus, with its own pagination, so that supplements can be issued later as demand arises. Each fasciculus is published in the native language of the author—English, German, or French. Other languages are excluded. The illustrations are both plain and coloured. Fasciculi 1 to 130 have already appeared. Specimen pages and plates may be had free, post paid. For further information application should be made to P. Wytsman, Quatre Bras, Tervueren (Belgium).

SCIENCE NOTES.

In a lecture at the Imperial College of Science Mr. Clifford Dobell recently gave an account of the work on the production of strains of trypanosomes without kineto-nuclei, which was initiated by Werbitzski in 1910. It is to a certain extent a direct result of Ehrlich's well-known chemo-therapeutical researches. Werbitzski was engaged in investigating the effect of various chemicals, particularly dyes, upon trypanosomes when he made the startling discovery that after treatment with certain of these substances the trypanosomes lost their kineto-nuclei. The trypanosomes did not appear to be otherwise much affected as they were no whit less active, and continued to multiply in the animal in which they were being cultivated. Not only so, but after being passed through a series of animals, and being subjected to the same treatment in each a strain was eventually produced at the fifteenth passage, which had permanently lost its kineto-nucleus. This process was continued by Kudicke, who carried it on to the 115th passage, and found that undoubtedly a permanent strain had been produced, differing from the original only in lacking a kineto-nucleus. Unwilling to credit these astonishing results, Laveran undertook to repeat the experiments, but his work, done partly in conjunction with Roudsky, has served only to confirm Werbitzski's statements. The substances which produce this remarkable alteration are what Ehrlich terms "orthoquinoids," double ring compounds of the form of diphenylmethane and diphenylamine, and their names are acridin, pyronin, and oxazin. No other substances have been found to produce the same effect. These dyes first stain the kineto-nucleus, then kill it, and cause its absorption. The process appears to be one of what may be termed "autoxidation," for it is restrained in the presence of potassium cyanide. These results do not apply only to one species of trypanosome. They were originally observed in the case of *Trypanosoma brucei*, but they have been found to occur also with *T. gambiense*, *T. lewisi*, and several other species. Whatever their significance, there can be no doubt that they are of very great importance to experimental zoology, and are further evidence of the remarkable results which are attending investigations along chemo-therapeutic lines.

It is a well-known fact that it is difficult to be absolutely certain of the identity of the cholera organism. In many cases vibrios differing essentially from the cholera vibrio have been isolated from the faeces of patients presenting all the clinical symptoms of cholera, while on the other hand in cases of true cholera much variation has been encountered in the organisms isolated. These difficulties are emphasized in the recent report from Alexandria by Crendiropoulo.[1] He undertook the bacteriological examination of persons landing in Alexandria from countries infected with cholera, and in the course of his work isolated 63 strains of vibrio, of which 52 were thoroughly dealt with. As a result of this investigation he forms the general conclusion that none of the diagnostic tests at present in use are absolutely specific. Some of them, however, are more reliable than others, and amongst the most constant he would place complement fixation and agglutination. Other characters, such as virulence for the pigeon, liquefaction of gelatine, coagulation of milk, production of haemolysins and the indol reaction are either inconstant or common to all vibrios. Basing his opinion on this experience, taken in conjunction with that of others, he suggests as the most desirable administrative measure that all carriers of vibrios, agglutinable or not, coming from epidemic centres, should be held suspect, but that on the other hand the presence of vibrios in the faeces should not be considered of serious import provided the persons do not come from an infected region.

[1] Rapport sur l'examen des selles des voyageurs provenant des pays infectés de cholera. Conseil sanitaire, maritime et quarantenaire d'Égypte. 1912.

British Medical Journal.

SATURDAY, AUGUST 17th, 1912.

SIGHT TESTS IN THE MERCANTILE MARINE.

In June, 1910, a Committee was appointed by the Board of Trade to inquire into the question of what degree of colour blindness or defective form-vision in persons holding responsible positions at sea would cause them to be incompetent to discharge their duties, and to advise whether any alterations were desirable in the Board of Trade sight tests at present in force for persons serving in the merchant service or in fishing vessels. Many meetings were held and much evidence was brought forward both by seamen, ophthalmic surgeons, scientists, and also by some scientific men who themselves suffered from defects of colour vision.

The report it has now issued is in many respects a disappointing document. As was pointed out at the time of its appointment, both in these columns and by some of our contemporaries, notably *The Shipping Gazette*, the Committee in large part consisted of those who were responsible for the introduction of the wool test in 1894, and those who were definitely associated with it and advocated it. The Imperial Merchant Service Guild, in fact, refused to give evidence because of the constitution of the Committee.

From 1877 until 1894 the Board of Trade was content with the lantern and coloured cards, but, on the recommendation of the Royal Society, Holmgren's wool test was substituted for the others, and in 1909 two new skeins were added to the three (green, pink, and red) of the Holmgren test—namely, a light purple and a yellow—which were the same colours as used in the Edridge-Green classification test; but inasmuch as the confusion colours of the Edridge-Green test corresponding to these wools were not likewise added, it is rather doubtful if this modification really made any material improvement. The wool test as used by the Board entirely depended on the principle of matching, for the use of names was not allowed; it was carried out by examiners who possessed no medical or scientific training, and who for the most part consisted of masters of merchant ships and "clerical officers in mercantile marine offices." If a candidate appealed he was examined by scientists, but not by any one possessing medical knowledge. In 1909 the Board decided to raise the standard of the form vision test and to have each eye tested separately; this had not previously been done, so that a man with only one seeing eye could quite well get through. This new test will not come into force until 1914.

In considering the question as to the success or otherwise of the old tests the Committee makes the statement that the Board of Trade is not aware of the occurrence of any casualty which could be traced to defective vision, but it must be remembered that the Board has consistently refused to examine the sight of the look-out men in ships which have come into collision. This fact very largely discounts the statement made by the Commissioners in their report that "we have examined a large number of reports of Board of Trade inquiries, and the result of our examination has confirmed the view that *no official evidence exists* [italics our own] of casualties due to this cause." The report admits that out of 40,000 examinations 48 officers were found to be serving at a time when their colour vision was so defective as to make them dangerous. That this number should be found out by the official test, which is discredited by so many observers, is surely bad enough. "Apart, however, from these results we have no conclusive evidence placed before us of any case in which either a defective candidate has been passed or a competent officer rejected on examination for a certificate of competency for the Mercantile Marine." The Board of Trade seems to have forgotten the case of Mr. Trattles, who was many times passed and many times rejected by the examiners; it was not until after the lapse of years that a decision as to whether he was colour blind or not was really reached. It is admitted that since the 1894 tests have come into use there have been on an average 100 cases of collision a year attributed to "bad look-out." This brings to mind the case of a railway engine driver who had so much shortening of the red end of the spectrum that he was unable to see the red light if there was any haze at all. He twice ran his train past a red signal, and after inquiry was fined for being drunk, as it was assumed that this must have been the case, as otherwise he would have seen the light!

The report admits that possibly the present method does not exclude all dangerous persons, and that it is not proved that no accidents have been caused in this way, "since it has not been the practice in conducting inquiries into the cause of casualties to test the vision of the persons implicated." The Committee considers that this should in future be done, and if the recommendation is carried out it will be a great step towards elucidating these cases of "bad look-out." No doubt a shockingly bad look-out is sometimes kept in ships, or even no look-out at all, as occurred a year ago, when a steamer ran down a boat at anchor in broad daylight and three or four men were drowned. Here it was proved that there was no look-out, and that the man steering in the wheel-house could not possibly see where he was going. This case is mentioned as evidence that there is no desire to cast doubt on the assertion that many accidents are caused by mere laxness or carelessness in the look-out, but a large number classified as such are more probably due to defective eyesight.

It has been urged by Edridge-Green and others that a test for colour blindness which excludes the use of colour names and which relies on matching only is valueless, but the Committee states that the great advantage of the wool test is that it can be carried out without the naming of a single colour. Owing, however, to the fact that the test must be carried out in daylight, when the eye of the candidate is not in a dark-adapted condition as it would be at sea during the night, and to the fact that the test object is far too large to detect cases of central scotomata, the Committee expresses the opinion that a lantern test should be associated with the wool test.

Having considered the merits of many test lanterns, it has failed to be satisfied with any, and has itself invented another. One of the advantages claimed is

that this new lantern can be used by non-expert examiners, but the employment of such examiners at all is strongly to be deprecated. In this lantern a paraffin lamp is chosen "because it is the lamp used in the majority of ships." Considering that almost every steamship above the size of a coaster uses electric lights, and that there are very few sailing ships left, this is an extraordinary statement. In the Royal Navy nothing above the size of a picket boat uses anything else than electric light for navigation purposes except in case of emergency. "Such a source of light" (that is, a paraffin lamp) "does not, of course," the report states, "give a pure white, and a candidate may therefore easily call a light seen through the white glass red." But in order to ensure that he does not make this mistake, "his attention should be drawn at this preliminary stage to this fact, and the difference between the bright (that is, white) and red lights should be emphasized" while the largest aperture is being used. Now there are many colour-blind people who would know by the luminosity of a light whether it were a "bright" light or a red one if shown first one and then the other, and as, for the benefit of the "non-expert examiner," modifying glasses are excluded, the luminosity remains constant, and only the size of the aperture is varied. Such a lantern will stand at once condemned in the eyes of all those who have really studied this useful test. Even if a candidate calls "a red light green or vice versa" and is rejected thereby, the Committee think that an appeal might be allowed, but there ought to be no loss of time in hearing the appeal. If the Committee's lantern is to be used in the way suggested, it is, perhaps, just as well that the wools should be retained. "When these tests have been in use for a certain number of years, the results of the two methods should be compared, and the question of dispensing with one or the other could be considered." Most persons of experience have, we believe, long been convinced that the wool test is a thoroughly bad one, and that the lantern test used by an expert is not only good enough to detect the dangerous cases, but will not reject slight cases of colour blindness of no practical importance.

The fallacies of the wool test are recognized in the Royal Navy, and years more are not necessary to demonstrate their imperfections for the mercantile marine. It is not so much the slight cases of colour defect passed by this test, though very often they are rejected, but the gross cases frequently passed which it is important to find out.

We are glad to observe that the Committee has recommended that an ophthalmic surgeon should be added to the present body of examiners in appeal cases. This is one of the most useful results of the Committee's work and deliberations. The recommendation that the colour ignorance test should be abolished is also good; it assumed that a person whose intelligence was sufficiently good to make him a candidate for a ship's officer might yet be so ignorant that he would not know what red and green were. "No candidate has ever failed to pass this test." Of course not; a colour-blind person might well not know the difference, but it is quite certain that no one else could fail to have this knowledge.

It is to be hoped that the Imperial Merchant Service Guild, which has done so much good work in the past, will not be satisfied until the eyesight of candidates is examined by ophthalmic surgeons instead of by lay examiners who have no expert knowledge.

TUBERCULOSIS, COMPULSORY NOTIFICATION, AND SANATORIUM BENEFIT.

WHILE the Representative Body was working out the policy which was to guide the conduct of the members of the British Medical Association in reference to sanatorium benefit, certain aspects of the question were being discussed by the Section of State Medicine from the administrative side. The Chairman in opening the discussion, which is reported this week, said that it was not concerned with sanatorium benefit or the Insurance Act, notification of phthisis being independent of the Act. But can we separate notification as a first step from the object of notification—the treatment and possible cure of the phthisical patient, and the prevention of infection? As Dr. McVail said further on—rather in contradiction to his former statement—"compulsory notification is a means to an end, it is never an end in itself." This is the only line that can be taken, and was that taken by all the subsequent speakers.

The discussion was marked by great variety of opinion, and it was evident that, so far as the patient was concerned, doubt and darkness hung round his future. On some things there was unanimity, as that the environment of the patient must be altered, that overcrowding and insufficient ventilation must cease, and that damp, dark, and dirty dwellings, with scarcity of good food, were potent factors in the production of consumption, and that there was still a crying need for a good supply of pure milk. Legislation for this last has long been promised by the Local Government Board, but seems as far from attainment as ever. Nevertheless, until the home of the patient and his surroundings are cared for and a good milk supply made available, tuberculosis dispensaries, special hospitals, sanatoriums, and all the rest of the improved paraphernalia but tinker with the subject. We want instead a vigorous and rational attempt to prevent tuberculosis by going to the root of the matter.

While throughout the profession there are differences of opinion as to the wisdom of the decision come to at the Representative Meeting in regard to the working of sanatorium benefit, there will be no lack of loyalty to the policy adopted by the Association nor of goodwill in the carrying out of the work to be done in respect of the administration of sanatorium benefit, so long as the State Sickness Insurance Committee, to which the duty has been delegated, sees to it that the conditions and safeguards are faithfully adhered to. Medical practitioners are just as firmly pledged to the cardinal points as regards sanatorium benefit as they are to those affecting medical benefit, and they are convinced that unless the Local Government Board deals fairly and honourably by them, winning their cordial goodwill and sympathy, the sanatorium benefit will not be successful.

In considering the relation of the medical practitioners to the working of the sanatorium benefit it seems usually to be assumed that the report of the Astor Committee has laid down the general plan. Now, it is not easy to forget the unfortunate and unsatisfactory fact that it contained no representative of the men who were actually fighting this disease, and that some of its members can have had very little practical acquaintance with its treatment or prevention. Nor is confidence increased when we find that the tendency is rather to push the general practitioner into the background and put the work into the hands of whole-time medical

officers attached to the dispensaries. Some apprehension naturally arises also that not only the general control but also the supervision and even the administration of treatment may drift into the hands of the medical officers of health, who, owing to the unnecessary haste with which sanatorium benefit had been brought into force, are now in many places acting temporarily as tuberculosis officers. It appears, indeed, pretty clear from the tone of the papers read in the Section of State Medicine that the medical officer of health is an exceedingly important personage in the carrying out of sanatorium benefit. He will want to know the condition of every person residing in the house of a phthisical patient. He must see that those requiring medical treatment receive it, and by him personal instructions are given with a view to the prevention of infection of other members of the household. "In doubtful cases he is to have the expectoration examined," and so on.

If, however, we turn to the Local Government Board's General Order for Domiciliary Treatment of Tuberculosis, we find under Article II that the medical practitioner has got work assigned to him. He is to attend on the patient at his home, give instructions, keep on a card a continuous clinical history of the case, submit this card to the consulting officer at specified times, at least every three months send a full report of each patient, confer with the consulting officer with regard to all his patients, and finally now and again inform the medical officer of health as to the sanitary conditions generally under which patients are living, and give his opinion as to whether the medical officer of health should take action thereon.

The specimen card given under Article III sets out thirty-five different entries to be made on one side, some of them easily answered, others taking time and needing consideration; on the other side there is a temperature chart, and notes of pulse, weight, sputum, rest, exercise, and treatment by tuberculin or otherwise are to be made. This is no inconsiderable list of varied duties. Nothing is said about the payment for all this work, which is the more remarkable when it is recommended that a fee of 5s. should be paid for a medical report on an applicant for sanatorium benefit. We await with interest an announcement in regard to the fees the Local Government Board considers should be paid. We thus have the domiciliary, the dispensary, and the sanatorium units of service. The position the British Medical Association has taken up in regard to the sanatorium benefit is (1) that the remuneration shall be adequate for the work done. (2) That no whole-time tuberculosis officer or assistant shall give domiciliary attendance except as a consultant. (3) That the work of the "Chief Tuberculosis Officer" shall be confined to diagnostic and consultative work at the dispensary, and that the rest of the staff of the dispensary shall, as far as possible, be formed of medical practitioners serving on a rota. (4) That there shall be free choice of doctor. (5) That patients should be given attention at the dispensary only on the recommendation of their medical attendant and (6) that the general medical profession shall have adequate representation on consultative and voluntary care committees. From this position the profession will not recede. The risk is that by insidiously advancing this and that as temporary expedients the authorities may entangle the general medical profession in work under conditions which will weaken its main position. These temporary conditions will have a tendency to become permanent and should be watched with the most jealous care.

HOSPITAL RESIDENTS AND THE INSURANCE ACT.

DR. A. G. BATEMAN, General Secretary of the Medical Defence Union, states that the Union is about to deal with a case raising the point whether hospital residents (medical officers, house-physicians, and house-surgeons), whose honorarium with board and lodging does not exceed £160 a year, are liable to compulsory insurance under Part I of the National Insurance Act. Dr. Bateman asks that hospital residents should let him know whether they have been required by their boards of management to take up cards of insurance, and whether in such cases any deduction for stamps has been made from their remuneration. Dr. Bateman adds that it is hoped that some arrangement may be made by which medical officers, who cannot be said to require the benefits under the Act, will be exempted from its provisions. In the SUPPLEMENT for July 13th was published a letter, dated June 29th, addressed by the National Health Insurance Commission for England to a resident medical officer of the General Hospital, Nottingham, in which the Commissioners stated that resident medical officers appeared to be liable to compulsory insurance under Part I, where the rate of remuneration did not exceed £160 a year. It was added that in the calculation of remuneration the value of board and lodging provided should be taken into account, but no account would be taken of private income, although if such private income, not dependent on the personal exertions of the recipient, amounted to £26 a year, it would entitle him to obtain a certificate of exemption. It was pointed out, however, that if he obtained such a certificate it would not relieve the hospital board from the liability to pay the employer's share of the contribution. It is to be hoped that the information asked for by the Medical Defence Union will be furnished, for the point is one which ought to be settled. The Commissioners appear disposed to interpret the Act in the strictest possible way, and we observe that they have recently decided that professional football players are engaged in manual labour, and must, therefore, be compulsorily insured, whatever their earnings. The information for which Dr. Bateman asks should be addressed to him at the Medical Defence Union, 4, Trafalgar Square, London, W.C.

DEVELOPMENT OF THE HUMAN NOSE AND LARYNX.

IN recent numbers of the *Journal of Anatomy and Physiology* there have appeared a series of papers by Mr. J. Ernest Frazer, Lecturer on Anatomy at St. Mary's Hospital, which throw an entirely new light on obscure problems connected with the development of the human nose, pharynx, and larynx. Although Mr. Frazer's researches are illustrated by drawings of models reconstructed from microscopic sections, the accompanying letterpress is so terse and so packed with fact that the novelty and importance of his discoveries may easily be overlooked. Mr. Frazer has demonstrated that the part of the cavity of the larynx which lies above the level of the true vocal cords (suprarimal part) is totally different in origin and nature from the part which lies below (infrarimal part). The suprarimal cavity of the larynx is really part of the pharynx, which is enclosed by the upgrowth during the second month of development of secondary processes, which form a new entrance to the larynx, the orifice between the aryteno-epiglottidean folds. The rima glottidis and true vocal cords represent the original orifice to the pulmonary tract. Certain of Mr. Frazer's observations on the development of the larynx help to explain a not uncommon and yet very remarkable condition seen in some children at birth. In such children every attempt at suckling is attended by a fit of threatened suffocation. After death—for the condition is always fatal—it is found that the oesophagus is divided into two parts—the upper part ending blindly behind the trachea, while the lower part commences by

an opening placed on the posterior wall of the trachea. Milk can only reach the stomach by passing through the larynx and trachea—an impossible route. Mr. Frazer's researches show that in the human embryo during the later part of the first month and earlier part of the second month the primary orifice to the pulmonary system undergoes a migration forwards. It is during the migration that the hinder part of the pharynx is divided so as to form the trachea in front and the upper part of the œsophagus behind. The strange anomaly just described is produced by an irregular division of the hinder part of the pharynx during embryonic life. Sir Morell Mackenzie collected over 70 cases of congenital atresia of the œsophagus of the nature here described; Professor Keith has recorded several cases lately, and a number of examples are preserved in the Museum of the Royal College of Surgeons of England. The condition invariably ends in death from starvation. This anomaly is one which is worthy of the attention of the surgeon, for such children are usually strong and otherwise well. Amongst other points which have been illuminated by Mr. Frazer's researches may be cited the presence of a part of the pituitary body in the pharynx and the peristence of the embryonic stalk of the pituitary outgrowth on the posterior border of the nasal septum—a condition recently recorded in a child by Mr. A. R. Tweedie. Mr. Frazer has shown, too, that the Eustachian tube is much more complex in its origin than is usually supposed; it is really an included part of the pharynx, not the modification of a single branchial or visceral cleft. Surgeons who are puzzled to explain the various anomalies found in connexion with the nose and throat will do well to consult the papers here cited, for they are teeming with original and absolutely trustworthy observation.

MEDICAL CONGRESS ON LABOUR ACCIDENTS AT DÜSSELDORF.

The third International Congress on Labour Accidents held last week at Düsseldorf was attended by some three hundred physicians and surgeons from all parts of Europe. It was engaged for five days in the discussion of questions relative to industrial diseases and injuries. The programme, which contained over eighty entries, was arranged by a committee appointed by the second international congress held at Rome three years ago. Among the leading European authorities on that committee are Dr. Marbaix (Antwerp), Professor Tscherning (Copenhagen), Dr. Liniger (Düsseldorf), Dr. T. M. Legge (London), Professor Sir Thomas Oliver (Newcastle), Dr. Desjardins (Paris), Dr. Kooperberg (Amsterdam), Dr. Bernacchi (Milan), Dr. Waegner (Charkow), Professor Ackermann (Stockholm), and Dr. Dollinger (Budapest). At a reception in the Royal Government Palace, Dr. Kruse, in the name of the Government of the Rhine Province, who welcomed the Congress, said that it was of immediate importance to a State which, like Germany, was directly concerned with the results of accidents to its workmen. The President (Dr. Thiem, of Kottbus), in acknowledging the courtesy of the Government and the city, said that the fundamental idea was to make the injured workman fit for efficient service as soon as possible. The scheme of work before the Congress covered a wide field, including, *inter alia*, consideration of the Compensation Acts in force in the various countries, insurance against special trade diseases, importance of early functional treatment, vascular diseases and accidents, and methods to be adopted in examining the injured. Dr. Liniger, Medical Director of the Rhine Province, to whom much of the credit for the success of the arrangements for the Congress was due, read the first paper; it dealt with the initial treatment of industrial accidents. He recommended immediate notification and immediate attention, and that where the slightest doubt existed there should be an immediate consultation, presumably with a State officer. While insisting on the need for the specialist expert, both as regards diagnosis and treatment, he urged that the ordinary practitioner ought to be encouraged to feel that he was being helped, not brushed aside. After discussing the administrative as well as the medical aspects of early functional treatment, particularly of fractures and dislocations, he insisted on the importance of giving due consideration to the patient's state of mind and endeavouring to secure his co-operation. Among a group of special papers dealing with details in the treatment of fractures was one by Professor Bardenheuer (Cologne), who demonstrated in certain typical cases how by a system of bandages, weights, and pulleys it was possible to put the bone in its normal position, and to restore to the limb its normal function by making active and passive movements possible soon after the accident. Dr. Steinmann (Berne) explained his manner of using strong needles inserted into the bone so as to provide points at which pulls might be applied independently of adhesive bands. Dr. Waegner (Charkow) urged that cases of fracture of the femur should be treated in a hospital where time, skill, and appliances could be brought to bear, in order to obtain both a perfect anatomical union and a good functional result. Emphasis was laid on this latter aspect of surgical results by a series of contributions on functional treatment. Dr. Lucas-Championnière (Paris) said that, as a consequence of medical routine, and in some measure also of the French law which restrained an injured workman from commencing work until a complete cure had been effected, but most of all through the influence of "compensation," the defects of non-movement treatment had become glaringly obvious. For restoration of function a certain degree of movement must follow on the heels of the accident, but he uttered a warning against rash enforced movements after a period of fixation. He was disposed to advocate payment of a bonus for quick recovery of function after an accident. Dr. F. De Marbaix (Antwerp) in discussing recovery from wrist displacements, shoulder dislocations, and fracture of the femur, quoted hospital results to show the efficacy and necessity of movement treatment. Dr. Bum (Vienna) drew a distinction between an anatomical and a functional cure, and said that while treatment must favour the rapid and regular formation of callus, muscular atrophy, fixation of tendons, and ankylosis of articulations had to be strenuously withstood. Basing his remarks upon large experience in the suturing of tendons, Dr. James R. Kerr (St. Helens, Lancashire), in a contribution on early functional treatment, recognized the economic importance of returning the victims of industrial accident to a fit state and as soon as possible to their normal employment; but, while acknowledging the immense possibilities of functional treatment, said that after-treatment frequently proved futile unless the previous treatment had been efficient. In cases of tendon division there was involved the probability of the loss of the highly specialized hand of the skilled artisan. Accordingly the restoration of function must be the surgeon's primary consideration, and he must not permit himself to believe that any amount of after-attention would atone for disregard of the best methods of operative repair. Another contribution from England was by Dr. Frank Shufflebotham, medical referee under the Workmen's Compensation Act for the North Staffordshire District, who discussed the importance of early functional treatment in cases of contusions and sprains of the back. His experience indicated, in many cases, unsatisfactory treatment and undue length of period of disablement. If functional treatment, resting on a reasonably accurate diagnosis, were pushed, good results would follow. In a paper on traumatic neuritis, Dr. Moody (Stoke-on-Trent) examined the probability of the determining cause being of germ origin. He stated the results of some experiments in the application of the ionic treatment to such

cases, and particularly of the electrolytic introduction of salicylic and zinc ions in lumbago and carbuncle. Most of the papers presented to the Congress were of a specialized order, some dealing with diseases belonging to particular industries, others examining the relations that may exist between accident and disease, and therefore concerned with medico-legal questions. When so many men of experience meet to interchange views on subjects in which all are engaged and in earnest there cannot fail to be most valuable outcomes. There is, however, more than the mere giving and receiving of results. There is an atmosphere and an enthusiasm which affect not merely the members of the congress but also the general public. Representatives of Switzerland stated that the importance of the questions that concern these international congresses is so fully appreciated in that country that industrial accidents and diseases will henceforth form an essential subject in a graduating course in medicine, and special lectureships will be established to meet the requirement. The city of Düsseldorf not only helped the Congress by providing adequate accommodation, but offered such entertainments as are to be had at the Great Exhibition of Cities, at the Zoological Gardens, music in the town hall, a free car service, and a six hours' trip on the Rhine. It was decided that the fourth International Congress be held in Paris in 1914. Dr. James R. Kerr (St. Helens, Lancs.) was elected to represent England on the International Committee.

RADIO-ACTIVE BATHS.

In the course of the proceedings of the Section of Electro-Therapeutics at Liverpool, radio-active baths came, incidentally, under discussion, and Professor Rutherford, whose authority in connexion with radio-active substances will be universally recognized, pertinently asked what definite evidence there was that the benefits derived from the baths were due to radio-activity. In France, as in this country also, the surgical possibilities of radium have attracted chief attention, but in Germany and Austria its value in disorders of a medical kind has been studied, the emanation being mainly used for the purpose. It was, however, first employed for the preparation of radio-active baths, the theorists being influenced by the consideration that since radium emanation is exceeding soluble, the alpha rays would thus be allowed full play, and the clinicians, by the knowledge that certain natural waters of admitted therapeutic value had recently been proved to be radio-active. Artificial radio-active baths soon obtained a great vogue, their alleged value being attributed to absorption of alpha rays through the skin. Before long, however, the physicists pointed out that if the baths in fact did do good, such benefit could not be due to cutaneous absorption, because, owing to the readiness with which alpha rays are stopped by very thin layers of water, it was very doubtful whether any material quantity ever reached the skin. The advocates of the bath then took up the position that the baths did good owing to pulmonary absorption of rays from the surface of the water. Professor Lazarus, at a meeting of the Berlin Medical Society early this year, admitted that the physicists' objections to the theory of cutaneous absorption were well founded, and maintained that the theory of pulmonary absorption was also untenable. In an investigation conducted with Wick he had found that the accumulated radio-activity of the air immediately over the water of certain naturally radio-active springs was exceedingly small even when the time limit of the experiments was prolonged for a period many times greater than the duration of a bath. In view of this and the other physical considerations and of the fact that the radio-activity of artificial baths never equals that of many well-known natural waters, he suggested that there was no theoretical justification for their employment while clear clinical evidence of their value had yet to be produced. In Germany, though artificially radio-active baths are no longer generally esteemed, there is still a very general belief in the therapeutic importance of emanation in internal medicine, though there is much difference of opinion as to the most effective method of introducing it into the system. Lazarus and other investigators appear to regard its introduction through the intestine, dissolved in water, or through the lungs by inhalation, as equally effective provided the dosage in either case is adequate.

EXPLOSIONS IN COAL MINES.

The recent lamentable disaster at the Cadeby coal mine has lent added importance to the preparations now being made at Eskmeals, on the coast of Cumberland, for experiments on a large scale as to the causes and propagation of explosions in coal mines. For some months past a small committee appointed by the Home Secretary has been preparing the way for a more thorough investigation than any yet undertaken. In a recent report the committee referred to the well-known fact that coal dust alone without any inflammable gas may be fired and propagate a violent explosion along the dusty galleries of a mine. This much has been established by laboratory experiments, but several questions have arisen which can only be settled by experiments on a scale approaching the scale of Nature. The Government has therefore accepted the offer of the Mining Association of Great Britain to lend experimental plant and apparatus, and a consultative committee, consisting of members of the Royal Commission on Mines and the Mining Association, has acquired a plot of land at Eskmeals, not far from Messrs. Vickers's gun range. The land is open to the sea, but on the other sides is quite surrounded by sand hills, and is sufficiently distant from any dwellings to allow of large-scale experiments without risk of danger or annoyance from the concussion or noise of the explosions. Every possible precaution is being taken to prevent danger to those engaged in the experiments; they will be able by means of electricity to work at a distance from the galleries in splinter-proof shelters and behind sand hills. The site has been connected with the Furness Railway, and laboratories, workshops, and plant for making gas and electricity have been fitted up. The galleries, which will represent a mine, consist of some hundreds of yards of boiler-plate tubes, one length of about 800 ft. being 7 ft. 6 in. in diameter, with a second length of 450 ft. 3 ft. 2 in. in diameter, and a third length of nearly 200 ft. 1 ft. in diameter. These can be connected together as required, and there is space enough to erect other galleries of such diameter as may be necessary. The galleries will be fitted with various recording instruments and apparatus for introducing inflammable gases either in bulk or in "blowers," while shelves and ledges are provided which can be strewed with coal dust. Electric wires can be carried from splinter-proof shelters to any part of the galleries to start an explosion. Thus a gas mixture may be fired in one of the smaller tubes and the flame propagated into the larger dust-strewn tube or a blower of ignited gas may be sent into what will represent a dusty road of a mine, while currents of air may be passed along the galleries to represent the draught in a mine. Various kinds of coal dust will be used and its inflammability tested, and apparatus is provided which will allow clouds of coal dust mixed with air to be driven through flames or over electric arcs, or heated platinum wires whose temperature may be measured. Experiments will be made with mixtures of coal dust with inert stone dust to see how far an explosion may be modified by such inert dust. Experiments on a laboratory scale with inert stone dusts seem to promise very satisfactory results, but doubts have been raised whether, on a large scale and with various

amounts of firedamp present, the stone dust may not favour explosions. The velocities and pressures set up by explosions of firedamp or of dust or mixtures of the two will be measured and tests made as to how far the explosions can jump over lengths of gallery which have been well watered or strewn with inert dust or otherwise treated. One of the most important points to determine is how an explosion once started can be checked or its range limited before it raises the fine dust and sends the flame through all the galleries of the mine. It is hoped that after the investigations now contemplated have been carried out the Government may see the advantage of maintaining the station for further experiments and research.

A SCHEME THAT FAILED.

It may be recollected that on February 29th last every medical man within a wide area of West Yorkshire, comprising Stanningley, Pudsey, Farsley, Rodley, and Calverley, who had any club patients gave notice that his services as medical officer of the society would not be available after June 30th. This course was taken owing to a general feeling that contract work on the then existing lines was unsatisfactory, both to the patients and to the doctors, and to the latter extremely distasteful. In April a deputation of the officials of the friendly societies waited upon the doctors, asking them to withdraw their resignation and to make some other arrangements. The doctors expressed their willingness to continue the work until the medical benefits under the National Insurance Act might come into force on an arrangement having for its basis the terms of the National Deposit Friendly Society. This was refused point blank, and the matter was not even referred to the respective societies for their decision, the deputation evidently considering the suggestion not worthy of consideration. An attempt was next made to induce the members to submit to a scheme for a whole-time medical service, the payment of the medical officer to be at the rate of 3s. yearly for each member. The utmost confidence was expressed that such service could readily be established, but only about 2,000 out of the 5,000 members consented to it. A Friendly Societies Council was, however, formed to represent these 2,000 members. It was found impossible to fill the post locally; but during June the body which calls itself the "National Insurance Medical Association" came to the rescue, and Dr. C. F. Knight of Edinburgh by letter introduced to the secretary of the local Friendly Societies Council Dr. Lachlan Macdonald of the Island of Eigg. In an interview published in the *Pudsey and Stanningley News* of August 2nd the friendly societies' secretary stated: "Satisfactory terms were arranged and an agreement made out, service to commence on August 1st." An inspired announcement that this post had been filled was made in the press while the Representative Meeting was sitting in Liverpool; this was timed, no doubt, to strike terror in the mind of medical men who contemplated similar resignations. The appointed day came and passed, however, and Dr. Macdonald had not reached Stanningley; nevertheless the secretary of the local Friendly Societies Council expressed himself "optimistic"; "he was expecting the doctor every minute." This expectation, however, was not fulfilled, and no explanation seems to have been offered at Stanningley. This is afforded by the *Aberdeen Daily Journal*, which in its issue on August 7th published a short report of an interview with Dr. Macdonald on his arrival at Mallaig from Glasgow. It appears from this that he had in fact left the Island of Eigg with the intention of going to Stanningley to interview the secretary of the friendly societies there, but when passing through Glasgow he ascertained from medical friends the actual state of the case, and did not continue his journey to Stanningley. Dr. Macdonald is to be congratulated on his final decision. The officials of the friendly societies in the district now no doubt regret the way in which they rushed into print, and it is to be noted that the president of the local Friendly Societies Council resigned in June, not indeed because his "interest and enthusiasm in the movement had diminished," but because he found it necessary to reduce his duties to avoid a breakdown in health.

A LIQUOR DISPENSARY SYSTEM.

Mr. Arthur Sherwell, M.P., has prepared for the Temperance Legislation League an account of the South Carolina "liquor dispensary system," which, although not in the opinion of the league the best form of disinterested management of the liquor traffic, and inferior in Mr. Sherwell's opinion to the Gothenburg system, presents certain points of interest. The system was originally established in South Carolina in 1893 as a State monopoly under centralized management and control; "on" sales were abolished, and it was enacted that alcoholic liquor could only be purchased in sealed packages or bottles for consumption off the premises. The minimum quantity of spirits allowed to be sold was one half-pint. The monopoly had a two-fold aim: (1) To reduce the evils of the liquor traffic in the areas in which public opinion required its continuance, by taking it out of private hands; and (2) to retain the whole of the profits for State and municipal purposes. The right of local veto was preserved. The system had certain undeniable advantages. It abolished bar-drinking, and substantially reduced the number of places where spirits were allowed to be sold; it also reduced the hours of sale; prohibited sales to minors, and abolished sales on credit. Among the defects of the system was a failure to recognize the principle of local management and control, apart from the right of veto; this led to a stereotyped rigidity of administration and a disregard of local requirements. The law was openly evaded in Charleston, the largest town in the State, by the establishment of illicit bars, and under the "spoils system" the centralized administration led to abuses. Some six years ago the State monopoly was abolished, and a system of local management and control, subject to certain statutory requirements and to State supervision and audit, was introduced, the right of local option being retained. South Carolina is a sparsely populated State, containing a population of about a million and a half, with only two towns of any importance, Charleston with 58,833 inhabitants, and Columbia with 26,319. The new system of local dispensaries was established in six counties in the State, containing a population of 275,000. In these six counties there are now 42 dispensaries, more than half being in or near Columbia or Charleston. The gross sales are under half a million sterling, representing an annual expenditure of £1 16s. a head; the nett profit is less than 28 per cent. on the gross sales. The sales, however, include those of certain beer bottling companies acting under a special licence. In 1892, under the system of private licence, South Carolina had 613 bar-rooms. In 1899, under the State monopoly system, these 613 bar-rooms had been replaced by 92 dispensaries. At the present time there are only 42 dispensaries in the State—namely, 27 for the sale of spirits only, 9 for the sale of spirits and beer, and 6 for the sale of beer. Three of the dispensaries were established last year. In spite of certain drawbacks which Mr. Sherwell recognizes in the system, he concludes by stating that "it is not seriously disputed in South Carolina that it is an important advance upon the system of private licence, and, in addition to the elimination of all inducement on the part of the liquor-seller to push the sale of alcohol, and a complete change in the character of the drink shops, it has the very great merit of destroying the influence of the saloon in politics."

MEDICINE AND THE PEERAGE.

The Committee of Privileges of the House of Lords recently gave a decision possessing a certain interest for the medical profession. It related to three baronies dating back respectively to the years 1313, 1322, and 1487. At the end of the Tudor period these baronies had become united in one holder, who was attainted of high treason. He left no children, and his brother, who was heir, was also attainted of high treason about the same time. In consequence his son could not inherit the baronies and they fell into abeyance. It was common for titles which had fallen into abeyance owing to the attainder of their last holder to be revived in the next or other early succeeding reign, but in this case no attempt seems to have been made to get the baronies revived, possibly owing to the fact that the individual whose uncle and father were both attainted was survived by no brothers nor by any male offspring. In the ordinary course, therefore, these baronies would have been not only in abeyance but extinct, but in the case of two of them there is clear evidence that their early holders were called upon by the reigning monarch of the time to sit in Parliament as peers thereof. In the case of such baronies the titles are descendible to heirs general—that is to say, they may be inherited by female in default of male children. In the former case, however, the law recognizes no seniority of birth, so there may be not one heir—the eldest surviving son—but a number of heirs corresponding to the number of daughters. Such heirs are co-heirs, and it rests with the monarch to assign such barony or other rank to which of them he pleases. In the present case the individual whose uncle and father were both attainted, and who but for this fact would have held the three baronies, though he left no male offspring, did leave four daughters, who were co-heirs to the baronies in abeyance. They all married in turn, but only the second is known to be represented by descendants in the present generation. Three of these, a year or two ago, submitted to the House of Lords a claim to be recognized as heirs of the dormant baronies, and these claims the Committee of Privileges decided to be proved in regard to the baronies of Burgh and Cobham. It therefore now rests with His Majesty to decide whether he shall reverse the bill of attainder which threw these baronies into abeyance, and, if so, which two of the three co-heirs he shall select. In strict law they all three stand on the same footing, but as two of them inherit their claims through elder children of the original co-heir than the third, it seems not unlikely that these two, if any, will be selected. If so, the medical profession would have a second representative in the House of Lords, since one of the two co-heirs in question is Dr. Reginald Gervase Alexander, of Halifax, who, after graduating B.A.Camb. in 1874, took the degree of M.D. at Edinburgh in 1881. He is now, after many years' service on the active staffs, Consulting Physician both to Bradford Royal Infirmary and Halifax Royal Infirmary. He was also an early worker in the field of preventive medicine, especially in regard to tuberculosis. An additional point of interest is that of his two sons the elder has already joined the ranks of medicine, so that the medical profession may well hope that the Royal prerogative will be exercised in the manner indicated.

SIR PATRICK MANSON.

Sir Patrick Manson, G.C.M.G., who recently retired from the acting medical staff of the Seamen's Hospital Society, which he joined in 1892, has been appointed consulting physician. His resolve to give up active service to the hospital was received with the greatest regret by his colleagues on the board of management, but it is some satisfaction to know that he will retain his position as senior teacher in the London School of Tropical Medicine. He will not, however, take any active part in the work during the next twelve months, which it is his intention to spend abroad, part of the time in Ceylon, where his son-in-law (Dr. Philip Bahar) is engaged as a research scholar of the school. In his capacity as medical adviser to the Colonial Office, Sir Patrick Manson represented to Mr. Joseph Chamberlain, who was then Secretary of State for the Colonies, the importance of establishing a school of tropical medicine in London. The school was opened on October 1st, 1899, with accommodation for twelve students. His energy and enthusiasm brought the school into existence, and his inspiring influence as a teacher and organizer of research led to the rapid development with which all are familiar. When the new wing which is now in course of construction is complete, there will be accommodation for 100 students in the large laboratory, 20 in the entomological laboratory, and 15 in the general laboratory for helminthology and protozoology. There are in addition other laboratories for advanced students. All this Sir Patrick Manson has lived to see accomplished in the short period of a little over twelve years.

THE RECENT CASE OF PLAGUE IN LIVERPOOL.

A case of plague in a child was admitted into the Royal Infirmary on July 24th with a diagnosis of appendicitis; the pulse was 130, temperature 103°, and he was delirious. There was a tense swelling over Poupart's ligament. A diagnosis was made before operation of acute disease of the iliac bone; the operation was performed at midnight on Wednesday, July 24th. When the incision was made three small haemorrhagic glands were discovered; there was no pus under the swelling or in the glands. A gland was removed, and a small portion of it was sent in a sterile test tube to the laboratory. On the following day it was examined in the course of the ordinary routine work by smears of the gland tissue stained with methylene blue, and cultures were made on nasgar. The smears showed numerous Gram-negative bacilli with characteristic bipolar stainings, and the cultures also had an appearance so typical of plague, that on Saturday Professor Ernest Glynn, Bacteriologist to the Royal Infirmary, advised immediate removal of the child to an isolation hospital without waiting for confirmation of the cultures by animal inoculation. Three rats were inoculated subcutaneously on July 27th with varying doses of the culture, and all died in two days with the usual characteristics of plague. The detection of plague bacilli in rats is more difficult than in human beings, because rats are occasionally infected with an organism (*B. pseudo-tuberculosis rodentium*) which resembles *B. pestis* is many particulars. The presence of a primary bubo and of pleural effusion is more characteristic of an infection of *Bacillus pestis*. It is also more virulent to rats than *B. tuberculosis rodentium*. It is generally believed that the latter organism can further be distinguished from *B. pestis* by the fact that it readily ferments iso-dulcite, decolorizes malachite green broth, and produces an alkaline reaction in litmus milk. It is interesting to note in this case that the boy had never been out of Liverpool. He had been in contact with relatives who lived a considerable distance from his home at the north end of the city. In the street in which the relatives lived an infected rat was discovered, and it was thought that the infection was conveyed by fleas, as the boy showed evidence of flea bites on his body. He has been treated with serum and is making a good recovery. Every precaution has been taken to prevent the spread of the disease; the boy's family has been isolated and all connected kept in close supervision by the health authorities. The examination of rats throughout the neighbourhood and docks is being systematically pursued by the health department.

The Lord Mayor of London, Sir Thomas Crosby, M.D., was entertained on August 13th at a banquet at the Grand Cercle, Aix-les-Bains, by the Aix Medical Society. Sir Thomas Crosby was welcomed by Dr. Goddard, president of the Society, and M. Blanc, Mayor of Aix-les-Bains. Among those present were Professors Chauffard and Faure (Paris), Professor Stockman (Glasgow), Dr. Hunter Tod and Dr. McCann (London), Dr. Jonesco (Bucharest), Dr. Suarez de Mendoza (Madrid), Dr. Gubb (Aix-les-Bains), and many other French and foreign persons of distinction.

Medical Notes in Parliament.

[From our Lobby Correspondent.]

National Insurance Act.

County Insurance Committees.

In reply to Mr. Lundon, the Secretary to the Treasury said that it was not compulsory on county insurance committees to form subcommittees for the purpose of the Act as far as sanatorium benefits were concerned.

Mr. Lundon then asked the Secretary to the Treasury how long the county health committees as they were at present constituted would last; when would the various approved societies get the power of nominating their real representatives; and if honorary members of an approved society could act on such committees if duly selected by the insured members of the society to which they belonged. Mr. Masterman said the persons who were made members of Insurance Committees by the various orders setting up the Committees would hold office until the date on which it was declared by the Insurance Commissioners that an Insurance Committee had been duly constituted for the county or county borough, or until July 15th, 1913, whichever date was the earlier. The Orders, however, in each case reserved power to replace the persons who were now representing insured persons on the committees by persons duly appointed under paragraph (*a*) of Subsection (1) of Section 59 of the Act, as soon as an appointment could be properly made under that provision. The reply to the last part of the question was in the affirmative.

Mr. Lundon also asked whether county Insurance Committees had anything whatever to say in the erection of sanatoriums or even dispensaries; would such questions lie in the hands of the various county councils; and, if so, what procedure would be adopted in places and districts where the latter would not take up the work. Mr. Masterman replied that sanatoriums and dispensaries might be provided by county councils and other local authorities, or by voluntary agencies. It was no part of the duty of the Insurance Committees to provide such institutions. In the event of there being no sanatoriums or no dispensaries in the committee's own district, the committee could make arrangements with local authorities or persons managing such institutions elsewhere.

Medical Benefit.

Captain Clay asked the Chancellor of the Exchequer whether an insured person would be able to choose the doctor he wished to be attended by, or whether, in order to obtain medical treatment, he would be compelled to be attended by a doctor who agreed to serve under the National Insurance Act, whether he had confidence in that doctor or not. Mr. Masterman replied that Section 15 of the Act provided for free choice of doctor by the insured person from a panel composed of all the doctors in any district who wished to work under the Act. An insured person, under Section 15 (3), might be allowed to make his own arrangements for medical attendance, and to receive a contribution from the Insurance Committee towards the cost of medical attendance.

Sanatorium Benefit.

Mr. James Mason asked the Secretary to the Treasury whether, in the administration of the National Insurance Act, preference would be given to schemes incorporating existing approved sanatoriums rather than to schemes which arranged for new sanatoriums in the same locality. Mr. Burns, who replied, said that the Local Government Board had urged upon local authorities the importance of utilizing existing institutions so far as practicable.

Mr. James Mason then asked the Secretary to the Treasury whether, in the administration of the National Insurance Act, in the event of an existing sanatorium being utilized, a grant would be made in return for all beds put at the disposal of the Insurance Committees, or only for the purpose of entirely new accommodation. Mr. Burns said that the main object of the capital grant was to stimulate the provision of additional sanatoriums, and he was not prepared to specify the particular circumstances in which an application for a grant in respect of an existing institution would be entertained.

Mr. Cassel asked the Chancellor of the Exchequer whether, in view of the fact that it had been decided to make sanatorium treatment available for all persons whether insured or not, and the injustice of making insured persons pay for benefits which uninsured persons also received, he would consider the advisability of doing away with sanatorium benefit under the National Insurance Act, 1911, and substituting other benefits, such as paying sickness benefit from the first day of illness, sanatorium benefit being made available under a national scheme for all persons alike. Mr. Lloyd George said that the question stated the case rather more broadly than the facts warranted. The matter depended on the conditions of administration of the grant, which the county councils had not yet submitted. In the absence as yet of any definite proposals on this point he was not in a position to give an answer to the question.

Mr. Cassel asked whether any insured person in England had yet received sanatorium benefit, and, if so, approximately how many persons had received such benefit. Mr. Masterman said that arrangements had been made by a number of Insurance Committees for the immediate administration of sanatorium benefit and he had no doubt that some cases had already been dealt with, but he was not in a position to give any estimate of the approximate number.

Expenditure on Sanatoriums.

Mr. Rupert Gwynne asked what would be the position of an Insurance Committee which, acting under its statutory obligation in providing sanatorium benefit, exceeded the sums at its disposal; would the committee be personally liable for the excess of expenditure, or would there be a reduction of sanatorium benefit or a levy on all insured persons in the area after the next valuation. Mr. Masterman answered that it would be the business of the Insurance Committees so to arrange their expenditure as to keep within the limits of the funds which they would have available. The alternatives referred to in the question would not therefore arise. Any excess in regard to the expenditure of one year would be carried over and debited to another year.

Sanatoriums (Ireland).

In reply to Mr. Devlin, Mr. Birrell said that the following institutions had been approved by the Local Government Board for Ireland: Sanatorium at Heatherside, established by the Cork Joint Hospital Board; sanatorium at Crooksling, established by the Dublin Joint Hospital Board; the Royal National Hospital for Consumptives at Newcastle, co. Wicklow; and the Forster Green Sanatorium at Newtownbreda, co. Down.

In reply to Mr. William Redmond, Mr. Birrell said that the Local Government Board had invited the county councils in Ireland to formulate schemes for the treatment of tuberculosis in their respective areas in connexion with the sanatorium grant. Except as regards the fact of the appointment of a committee to consider questions arising out of the grant, the Board had no information as to the progress made in county Clare. In the absence of details, no definite reply could be given as to the position of the Ennis Sanatorium in relation to the sanatorium grant, but no contribution would be made to a voluntary association merely on the strength of past expenditure.

Peamount Sanatorium, Dublin.

In reply to Sir John Lonsdale, Mr. Birrell said that the buildings in course of construction at Peamount had been carefully examined by one of the Local Government Board's inspectors. All the arrangements had been planned and were being carried out in accordance with the

most up-to-date and approved methods of sanatorium treatment. The sanction of the Local Government Board would continue to be required to the various forms of equipment.

Tuberculosis Grant (Ireland).

In reply to Mr. John O'Connor, Mr. Birrell said that paragraphs 35 to 38 of the Report of the Departmental Committee related to England and Wales and not to Ireland, and that the committee clearly recognized that the recommendations referred to in the question either would not be applicable to Ireland or would require considerable modification before being applied, having regard to the special circumstances of this country and to the absence of county medical officers of health. Copies of the report were furnished by the Local Government Board to all county authorities, and the services of the Board's medical inspectors were placed at the disposal of the councils, and had been generally used. The Local Government Board in Ireland was following the general lines suggested by the Departmental Committee and had not formulated any scheme of its own for acceptance by the county councils. The Board was prepared to make contributions from the sanatorium grant for any county scheme which made adequate provision for the treatment of tuberculosis.

Sanatorium Benefit in Scottish Highlands.

In reply to Mr. Bennett-Goldney, Mr. Masterman said that the whole question of medical benefit in the Highlands was being considered by a Departmental Commission appointed by the Treasury, pending whose report the Scottish Insurance Commissioners could express no opinion.

Insurance Act Amendment Bill.

A Bill to amend the National Insurance Act, 1911, with respect to the valuation of approved societies having insured members in various parts of the United Kingdom, was introduced by Mr. Wilkie on July 30th. The Bill is supported by Mr. O'Grady, Mr. John Ward, Mr. Hodge, Mr. Bowerman, Mr. Joyce, and Mr. Tyson Wilson.

Disease Attributed to Moulds.—In reply to Mr. Albert Smith, the Home Secretary said that he had received a report from the factory inspector, from which it appeared that some few weeks ago certain weavers in a Burnley factory were attacked by an unusual cough which affected their breathing. The shed was a dry one, ventilated by six exhaust fans, and the general conditions were good. In order to investigate the matter, the firm at once called in experts, who expressed the opinion that the outbreak was due to some mouldy sago in the size used in dressing the warps, causing mildew in the shed. In accordance with their advice, the mill was closed and thoroughly disinfected by the local authorities. The sago was now being specially treated to prevent the development of mildew and the warps damped by a solution of carbolic acid, with the result that a decided improvement had already taken place. A very similar outbreak occurred in a factory in Colne in the spring of 1911, which was also traced to mildew on the warps. After proper treatment and disinfection of the premises no further trouble occurred.

Hygiene on Shipboard.—Mr. Peto asked the President of the Board of Trade if he would state how many medical officers to the Board were acting at each of the various seaports in the United Kingdom; whether anything was done by them in supervising, during the construction of new vessels, the nature of the accommodation to be provided for the officers and crews, in order that such accommodation shall be adequate in space, ventilation, and in other matters ensuring proper hygienic conditions and eliminating any risks of subsequent insanitary conditions arising; and whether he proposed to appoint any further medical officers to deal with these matters. Mr. Robertson replied that the Marine Department of the Board of Trade had two salaried medical officers at Liverpool, and one each at London, Glasgow, and Queenstown. At other ports, such as Belfast, Bristol, Larne, Londonderry, Plymouth, and Southampton, local medical practitioners were employed as occasion required. The inspection of the spaces required on ships for the accommodation of the officers and crew was not made by these medical officers, but by the Board's staff of salaried ship engineers and nautical surveyors. The whole question of strengthening the survey staff was receiving the careful consideration of the Board of Trade.

Naval Hospital Accommodation (Harwich).—Captain Clive asked the First Lord of the Admiralty whether he was aware that the hospital accommodation at Harwich, which was said to be sufficient for one officer and eight seamen, consisted of two rooms, in one of which there was one bed and no other furniture, and in the other two beds, a table, and two chairs; that neither of these rooms appeared to have been papered, distempered, or painted for many years; that under the window of one of them there was a heap of stable manure, and that to this room an officer was recently taken to be operated on for appendicitis; and whether, seeing that Harwich was now a naval base, he would see that proper and sufficient hospital accommodation was provided. Dr. Macnamara replied that there were no naval sick quarters proper at Harwich. As at other places along the coast, there was an arrangement under which temporary accommodation was placed at their disposal as occasion arose. In the case in question a young officer was brought in very seriously ill with appendicitis. An immediate operation was necessary, and it was quite impossible to move the patient to more suitable accommodation. The operation was performed successfully and the young officer, who was doing well, had been removed to other quarters. The question of the medical arrangements at Harwich was receiving attention. They were not naval quarters; they were what he might call emergency quarters. He was not prepared to quarrel with the statement made.

Quarantine for Small-Pox.—Mr. George Roberts asked the Secretary for the Colonies whether his attention had been drawn to the fact that nearly 160 steerage passengers bound for Canada on board the *Pretorian* were put on the quarantine island in consequence of 2 cases of small-pox having been diagnosed, in spite of the fact that all these steerage passengers had been examined for marks of vaccination a few days previously, and that those whose marks were not satisfactory were vaccinated; and whether he proposed making representations to the public health authorities of Canada on the matter. Mr. Harcourt said that he had received a complaint to this effect, and had communicated it to the Canadian Government.

Forcible Feeding in Prison.—In reply to Mr. Lansbury, the Home Secretary said that Miss Alice Waters had been released from prison on July 23rd. She was fed by tube once, having for forty-eight hours refused to take food. She resisted, and became hysterical, and her release was recommended on account of her nervous excitement. After the order for her release was notified to her she calmed down and took food. On her reception in prison she was described as being in fair physical health. In reply to Mr. W. E. Harvey, Mr. McKenna said that a man would have been released under the same conditions, that is if he had become hysterical.

Housing of the Working Classes (No. 2) Bill.—This Bill, introduced under the ten minutes rule last week, proposes to use State credit for the purpose of housing the working classes by means of loans at a low rate of interest. The bill was introduced by Mr. Montague Barlow, and supported by Mr. Joynson-Hicks, Lord Robert Cecil, Mr. Frederick Edwin Smith, Sir Arthur Griffith-Boscawen, Mr. Astor, Mr. Guinness, Colonel Kyffin-Taylor, Mr. Baird, Mr. Norton-Griffiths, Mr. George Gibbs, and Major Dalrymple White.

The Adjournment of both Houses of Parliament took place last week on the Wednesday, and October 7th was fixed for the reassembling of Parliament. The House of Commons will on that day discuss the report on the *Titanic* disaster, and afterwards consider the Prime Minister's motion for the appointment of an additional judge. The Royal Assent to 129 Bills was announced in the House of Lords.

Scotland.

[*FROM OUR SPECIAL CORRESPONDENTS.*]

The Chair of Medicine in the University of Aberdeen.

Dr. Ashley Watson Mackintosh has been appointed by the Crown, on the recommendation of the Secretary for Scotland, to be Regius Professor of Medicine in the University of Aberdeen, in the vacancy caused by the resignation of Dr. D. W. Finlay. Dr. Mackintosh, who is an Aberdeen student, graduated M.A. with double first-class honours in 1888, and M.B., C.M. (1893), and M.D. (1896), in both cases with the highest honours. He is a physician and lecturer on clinical medicine at the Aberdeen Royal Infirmary. His contributions to medical literature have dealt chiefly with neurology.

Post-Graduate Courses in Glasgow.

Hitherto the Western Infirmary has not undertaken regular post-graduate courses, but some of the physicians have arranged to give post-graduate clinical courses next month. The work has been so arranged that special aspects of clinical medicine will be discussed by each physician. Professor Stockman will devote attention to rheumatic affections, Dr. Wm. MacLennan and Dr. Barclay Ness to gastric disorders and nervous diseases, and Dr. Wylie Nicol to diseases of the skin. The meetings will be held from 9 to 10.30 a.m., and the first will take place in Professor Stockman's wards on Tuesday, September 3rd.

The Edinburgh Royal Infirmary.

At the meeting of the managers of the Edinburgh Royal Infirmary on August 5th a letter was read from Professor Greenfield intimating that as he was retiring from the Professorship of Clinical Medicine in the University, he would resign his position as Consulting Physician to the Infirmary. The Chairman expressed the managers' thanks to Professor Greenfield for his services during the past thirty-one years, and it was left to Sir J. O. Affleck to draft a minute in connexion with Professor Greenfield's retirement which takes place early in September. A communication was read from the University Court asking the managers to appoint temporarily a lecturer in Clinical Medicine from the medical staff of the Infirmary, in view of the fact that the University Court will have under consideration the question of the institution of a special Professorship in Clinical Medicine, the holder to be placed in charge of the wards which were under Professor Greenfield. The matter was remitted to the Medical Managers Committee. At the same meeting the managers adopted a minute with reference to the resignation of Mr. J. M. Cotterill, Senior Surgeon of the Infirmary, recording their obligation to him in giving so freely and so willingly of his time and thought to the institution for nearly thirty years, and appointing him a consulting surgeon. A portrait of Mr. Cotterill subscribed for by a number of his former students, who desired to present it to the infirmary, was accepted by the board.

The Motto of the Edinburgh Royal Infirmary.

A correspondent has drawn attention to an error in the spelling of *pauperibus* which, in Dr. Dewar's paper, published in the Journal of August 3rd, p. 218, appears with two r's. The author now desires to express contrition for the error, and has sent the following additional information with regard to the history of the motto of the Edinburgh Royal Infirmary:

As regards the history of the motto, I may say that the words in the Charter granted by George II in 1736, are in English, and that the Latin motto and crest was designed by Dr. John Clark in 1749. The Charter goes on to state "for the maintenance and cure of *sick poor* in North Britain." Again, "a subscription has now produced a fund of about three thousand pounds sterling, the interest whereof . . . is to be applied for erecting a house in Edinburgh, wherein *poor sick* properly recommended from any part of the country, who are not absolutely incurable, are to be taken care of by the Royal College of Physicians of Edinburgh, and some of the most skilful chirurgeons," etc.

Supplies from Scotland were found insufficient for the undertaking. The managers, therefore, appealed to England, Ireland, and the British Plantations, and consequently ordered that the *sick* should be admitted (not otherwise excepted by the rules of the house) as patients from whatever country or nation they should come. It is evident that the motto "patet omnibus" inscribed on the gateway meant that the Infirmary was open to *all sick poor* from whatever country or nation they should come, and that the motto should be "patet omnibus pauperibus," hence my argument. It is needless to say that the word "pauperibus" in Latin is mine, and that its absence has been the cause of the disagreement between the managers and the profession.

The British Dental Association.

The thirty-second annual general meeting of the British Dental Association was held in Glasgow from August 7th to 10th. Twenty-five years have elapsed since the association last met in Glasgow. The discussions took place in the anatomy department of the University. After Professor T. H. Bryce had welcomed the members on behalf of the University, Mr. Rees Price was inducted as President, and in his inaugural address drew attention to the pitiable position in which the defective drafting of certain clauses in the Education Act (Scotland) had landed the educational authorities. Practically all that was obtained by the present system of medical inspection of school children was a mere record of the various diseased conditions of body and teeth, as no provision could be made for alleviating or treating the defects or diseases discovered. The educational authorities were fully alive to the necessity of following up the detection of disease by preventive or curative treatment, but, owing to the defective draftsmanship of various clauses in the Act, they were unable to determine whether it gave them power to undertake treatment. The Education Committee of the Privy Council was unable to determine the meaning of the Act, and apparently the only course open, failing the passing of an amending Act, was to obtain the verdict of the Law Courts in a friendly action. The Government had allocated to Scotland a proportion of the special grant in aid of medical treatment, but even if the greater portion of this £900 so coming to Glasgow was devoted to dental treatment it would not be sufficient. Most of the other scientific papers were of interest only to dentists, but Professor Bryce gave an illustrated lecture on the teeth of prehistoric man, and Dr. J. H. Nichol a demonstration with lantern slides on the treatment of hare-lip and cleft palate. The social side of this conference was well looked after. There was a reception by the Lord Provost and Corporation, and the Royal Faculty of Physicians and Surgeons also entertained the association.

Ireland.

[*FROM OUR SPECIAL CORRESPONDENTS.*]

Medical Superintendents of Tuberculosis Dispensaries.

The county councils of Antrim and Down and of Belfast are taking steps to establish dispensaries in connexion with the National Insurance Act, and the Down Council has already appointed a medical superintendent. This appointment was made on August 9th, the successful candidate being Dr. John R. Gillespie, formerly of Newry, but recently Assistant Medical Officer of Health for Hampshire. At a meeting in Belfast on August 6th the Antrim County Council nominated a special committee which will advertise the appointment in Antrim. In Belfast a scheme is under consideration designed to complete the work of existing institutions. It appears that at present the treatment of tuberculosis is costing the ratepayers £18,000 a year.

The Peamount Sanatorium.

Dr. Joseph Daniel, who for two years acted as medical attendant to tuberculous patients receiving home treatment under the supervision of the Dublin Hospitals, Tuberculosis Committee, and who, since November, 1911, has been assistant medical officer at the P. L. Collier Memorial Dispensary, has been appointed temporary medical officer to the Peamount Sanatorium; and Miss C. H. Brennan, who has been matron at the Allan A. Ryan Home Hospital for Consumption for the last two years, has been appointed matron.

Limerick Doctors and the Insurance Act.

At a meeting of the Limerick City Insurance Committee last week a provisional scheme for the administration of

sanatorium benefits under the National Health Insurance Act was approved. Dr. W. Fogerty said that the Limerick Doctors' Committee had held a meeting the previous night, and agreed that they would be willing to give their services in attending tuberculous patients for a capitation fee of 5s. per week, or £1 a month, the visits to number one or two each week, as found necessary. The fee would be for attendance at their homes, and would also include medical certificates to the committee of the progress of tuberculous patients under the charge of the medical attendants. The committee unanimously accepted the proposal; it was pointed out that, on the authority of Dr. Maguire, medical commissioner, there were 300 tuberculous patients in the city, though all these would not necessarily be insured persons. It was stated that between twelve to fourteen thousand persons in the city were insured under the Act.

Census Returns for Dublin.

The census returns for the city and county of Dublin published last week contain some interesting figures. In the city the population has increased by over 14,000, or 4.87 per cent. The number of tenements of one room was 21,133; there were 5, 6, or 7 occupants in 4,609 cases, and in 643 cases the occupants exceeded 7 in number, including 45 cases of 10 persons, 16 cases of 11 persons, and 5 of 12 or more persons in the room. There was a slight fall in the number of persons receiving Poor Law relief since the last census from 1 in every 30 of the population to 1 in every 32. The number of pupils attending school in the city according to the census of 1901 was 46,535, in 1911 the number returned was 46,936. In the county of Dublin the population has increased by nearly 12,000; this increase has occurred about equally in the rural and urban districts in contrast to the rest of Ireland, where any increase that has taken place has been almost entirely confined to the urban at the expense of the rural districts. The number of one-roomed tenements was 2,844, comprising 382 cases in which there were 5, 6, or 7 occupants, and 51 in which the occupants exceeded 7 in number, including 6 cases of 10 persons, one case of 11, and one of 12 or more persons in the one room. The number of those receiving Poor Law relief has fallen from 1 in every 50 of the population to 1 in every 57. The number of pupils attending school has risen from 24,071 in 1901 to 26,589 in 1911. The number of emigrants during the last ten years shows a further decrease of slightly over 1,000, but this compares unfavourably with the decrease of over 14,000 in the previous decade. In both the city and county the females are in excess of males by 9,500 and 5,000 respectively. The increase in the population and the decrease in emigration are satisfactory, but other points in the report do not make such pleasant reading. The number of one-roomed tenements in both city and county is excessive, as also the number of people living in these rooms. The decrease in the number of those receiving Poor Law relief is very small, and compares unfavourably with the decrease seen in the returns of most of the other counties of Ireland. The figures for school attendance have remained practically stationary in the city, and show a very small increase in the county. Only 360 children are returned as boarded out from the city, and only 90 from the county; both of these figures are miserably small.

England and Wales.

[*FROM OUR SPECIAL CORRESPONDENTS.*]

MANCHESTER AND DISTRICT.

Sanatorium Benefit in Manchester.

The Manchester Sanitary Committee has adopted a memorandum setting forth the arrangements suggested for giving sanatorium benefit. It was stated that the complete scheme would involve the appointment of tuberculosis officers in connexion with a central dispensary or dispensaries, the provision of 150 beds for early cases, 150 beds for more advanced cases, and also beds for surgical tuberculosis, which are provisionally put down at 64. It was suggested that no capital expenditure would be necessary at present but that advantage should be taken of existing institutions, and as far as possible of their staffs, that so far as the treatment of phthisis is concerned the dispensary of the Consumption Hospital should be used as the chief central dispensary, and that the existing staff of physicians should be utilized, with the appointment of "the necessary number of whole-time officers in connexion with the Public Health Department of the Corporation." So far as immediate arrangements are concerned it is not proposed to grant sanatorium benefit to dependants, and this almost excludes from immediate consideration surgical tuberculosis. It was advised that provisional arrangements should be made for three months between the local Insurance Committee and the Board of the Consumption Hospital. The quarterly sum estimated for current expenses is put at £550, and of this the local Insurance Committee is to find half and the board of the Consumption Hospital the other half. As sanatorium benefit is only just now beginning, it is advised that only half of the quarter's retaining fees should be paid in the present quarter. This amounts to £156 5s., which is at the rate of £250 a year to each of the five medical officers of the Consumption Hospital. The Insurance Committee will have at its disposal for the first quarter £1,550, and, in addition to the two above-mentioned payments, it is suggested that it should set aside £500 "for services and treatment by practitioners," and another £500 to provide for the treatment of 28 cases for twelve weeks each at the Crossley Sanatorium at 30s. a week each; the remainder of the money, it is thought, will be required for sundry expenses. It is stated that "no assistance will be available in the treatment of advanced cases, the cost of which will fall entirely on the Corporation, at all events at first." Forms will be provided for cases receiving treatment, whether at dispensaries or at their own homes, by a practitioner or tuberculosis medical officer or in a sanatorium, so that their condition and progress may be reported in a uniform manner. Circulars and instructions are to be distributed, urging the necessity of obtaining immediate advice in cases of suspicious illness. The approval of the Local Government Board to the arrangements must be obtained before the physicians at at the Consumption Hospital can be definitely appointed. The report concludes: "It should be clearly understood that we are now in a position to provide dispensary services, treatment in a sanatorium, and treatment in a hospital, with the consent of the Local Government Board and of the local Insurance Committee. All that is necessary is that the formalities required by the Act shall be complied with."

The suggestions of the Sanitary Committee outlined above came before the City Council on August 7th, and a motion was made to refer them back for further consideration. This was lost by only a few votes, and the report of the committee was approved. It will now be sent for final approval to the Local Government Board.

Correspondence.

EXPERIENCE OF THE "DIORADIN" TREATMENT.

Sir,—In the number of 20th July of your scientific review there appeared an article by our distinguished fellow-member, Dr. Cecil Wall, Doctor of the London Hospital, on the treament of Tuberculosis by "Dioradin." In the course of this study, Dr. Wall refers to the conclusions of a communication I made, in March 1911, to the "Société Internationale de la Tuberculose" on this mode of treatment and cites himself ten cases of Tuberculosis treated by "Dioradin." Although he does not contest the exactness of my conclusions, Dr. Wall would appear to affirm that "Dioradin" does not exercise a direct and specific action on the general nutrition and on the toxines of the Koch bacillus. Thereupon I do not at all share our learned fellow-member's way of looking at the matter, and I can prove to him, by his own observations, that my works reflect the exact and scrupulous expression of scientific truth.

First of all, to which group of consumptives did the patients submitted by Dr. Wall to iodine-radium therapia belong? All, without distinction, had arrived at the third degree of tuberculosis, most of them had wide spread lesions (cavities or infiltrations), all numerous tubercle

bacilli in the sputum, some had fever and were in a state of profound physiological misery. But, in spite of these very bad pathological conditions, most of the patients observed by Dr. Wall increased in weight (which is a proof of the amelioration of the nutrition), the Koch bacilli diminished or disappeared, during or after the injections of "Dioradin," the cough and expectoration decreased.

In six cases improvement was noticed during the treatment; in one improvement had been maintained; four relapsed later on; and no subsequent report was obtained of another.

Therefore, out of ten patients, one of them completely cachectic, all had arrived at the last degree and represented such grave cases that none of them were justifiable for iodine-radium therapia, but they nevertheless benefited, to a certain extent, by this therapeutic method! However, as I remarked in my first efforts, and Dr. Szendeffy had affirmed it before me, "Dioradin" ought only to be used in tubercular cases of the first and second degree or on consumptives of the third degree who are in an excellent general condition. I have said, and repeated, that "Dioradin" will not work miracles, that it was counter-advised in all cases of ultimate or complicated tuberculosis, and exactly those grave cases have been chosen by Dr. Wall for his first experiments!

Since my first communication, eighteen months ago, of which Dr. Wall speaks, I have made another on the same subject to the French Congress of Medicine (Lyons, October, 1911), further to the recent International Tuberculosis Congress (Rome, April, 1912), and am now preparing a fourth account, accompanied by conclusive documents for the next congress. On the other hand, numerous communications from different distinguished fellow members have appeared on the same subject. Dr. Diamantberger, Head Physician of the Anti-tubercular Dispensary of the 9th Arrondissement, Paris; Dr. Hervé, Head Physician of the Sanatorium des Pins (France); Dr. Orlow, St. Petersburg; Dr. Brandaleone, Surgeon of Beach Hospital, New York; Dr. Atkinson Stoney, Surgeon of the Dublin Hospitals; Dr. Fritz Neumann, Physician of the Anti-tubercular Clinique of the German Hospital, New York; Professor Gerlöczy, Budapest: Dr. Spiridon Kanellis, Athens; Dr. Troche, Warmbrunn (Silicia), and many others have reported their observations on tuberculous patients treated, improved, or cured by "Dioradin." But most of these phthisiologists, like myself, have employed chemico-therapia on tubercular patients susceptible of improvement or cure but not on cachectics.

Only Dr. Wels, Sanatorium Physician, New York, experimented expressly with "Dioradin" under the same conditions as Dr. Cecil Wall—that is, he took thirty febrile tubercular patients, which had reached the third stage of the illness. However, the learned American physician concluded that "Dioradin" used under these unfavourable circumstances had nevertheless given 30 per cent. of improvements in absolutely hopeless cases.

But these ultimate cases should not be chosen for experiment. If Dr. Wall would take up his researches again by treating ten, twenty, or thirty consumptives of the first or second degree, I am convinced he would obtain the same results as other clinical physicians, and that he would rally with the same conclusions.

Since my personal works and those of Dr. Szendeffy, several German authors have made analogous attempts with chemico therapia. They have used iodine associated with methylene blue. Dr. Meissen, Head Physician of the Hohenhonneff Sanatorium and Prof. Strauss have treated cases of phthisis or lupus by intramuscular injections and have obtained the best results by that iodine therapia.

In a few weeks I shall be in a position to communicate to you new conclusions of a work being terminated, which will contain more than 500 observations made by myself or other colleagues and, Dr. Wall, after having read this new documented account, will be convinced that chemico therapia, employed with discernment, is capable of rendering the greatest services in the treatment of tuberculosis. It is not a question of an empiric method, but of a therapeutic which reposes on solid and precise scientific bases.

I should feel very much obliged to the Editor if he would kindly insert this open letter in the BRITISH MEDICAL JOURNAL, and in that anticipation I present to him my warmest thanks.

Dr. S. BERNHEIM,
President of the "Oeuvre de la Tuberculose Humaine."
Paris, July 27th, 1912.

TUBERCULIN TREATMENT.

SIR,—The best test of the value of tuberculin is surely to be found in cases which admit of direct observation—cases of lupus, of laryngeal tuberculosis, and of sinuses leading to tuberculous foci in glands, bones, etc., which, left to themselves, refuse to heal.

If Dr. Prest (August 10th, p. 339) would come to my dispensary for a single month his eyes would be opened, and I think he would trust rather to the methods which I have constantly advocated for the treatment of tuberculosis than to investigations which have led to the opinion "that tuberculin can only be of service in a small percentage of cases." He would also see that "cases where the disease is active, and therefore exhibiting symptoms," are best treated with tuberculin, provided the active disease is tuberculosis. I feel sure that three months at my dispensary would alter Dr. Prest's views, seeing that every medical man who has worked at my dispensary for a month has become a convert.

Dr. Prest is not likely to understand the value of tuberculin until he has used large doses. Dr. Nathan Raw never uses large doses, hence tuberculin treatment has been a failure in his hands. This explains the discrepancy between our respective conclusions upon the value of tuberculin, and no argument can decide between conflicting opinions except the argument of experience and facts.—I am, etc.,

W. CAMAC WILKINSON, M.D., F.R.C.P.,
London, N.W., Aug. 10th. Director, Tuberculin Dispensary.

P.S.—Dr. Prest might refer to p. 100, BRITISH MEDICAL JOURNAL, July 13th, 1912.

THE REPETITION OF PRESCRIPTIONS.

SIR,—Surely the moment is opportune, now that the Select Committee on the Sale of Patent Medicines is sitting, for the position in regard to dispensing of the medical man and pharmacist to be thoroughly ventilated. In your endeavours to check the abuses of this trade you have the hearty co-operation of the ethical dispensing chemist, but from the pharmacist who does not live on physicians' prescriptions you can only reasonably expect a jealous opposition. Leaving the first out of consideration, except as a model of what we all might become, we find that we have doctors doing work for which they are largely untrained and, by reason of their exhausting responsibility, unsuited, and chemists selling some articles, of which, perhaps, they are ashamed and venturing almost perforce into the dangerous realm of prescribing.

We have to live, and when prescriptions come not we must use our wits to find profitable business. The ideal, surely, is for the doctor to prescribe and the chemist dispense, and to my mind there is only one real difficulty in the way, and that is the "*repeat prescription*."

I have dispensed to-night one written on September 9th, 1895, which had 27 chemists' stamps upon it. I have had it several times—allowing, say, 5 to each dispenser, making 135 bottles of medicine, for which the doctor obtained one fee. I have also a prescription written by a locumtenent for a gout patient about five years ago, still being dispensed, for which I contend the doctor has received no fee.

I do not wonder that doctors are loath to give up dispensing in order that they may control this great abuse of their prescriptions. But is this the only way they can control it? English law says that the prescription belongs to the patient who pays the fee, but the doctor who writes it has the power to say how many times it may be dispensed, and if some writing like the following were printed at the top it would have the binding force of an agreement:

This prescription is given upon the understanding that it is for present indications only, and that it is not to be repeated more times than I order.

The above should be printed and under his own signature, the doctor should write how many bottles he wished supplied, and when it was only one, the pharmacist should

keep the prescription, and if two or three, he should write under his stamp "once" and the date, etc. If the doctor wished to give an open prescription he could use a paper without any such wording on. I do not think there would be any trouble in getting chemists to do their part in this, for in nine cases out of ten, when they refused to repeat a prescription, they would have a fresh one to take the place of the refusal.

There remains the question of the cost, but that need not trouble us, for we now dispense at 8d., 9d., and 10d. a bottle, and if we do it so finely now that business is lean, it would be easier still when the volume was more.

I am writing to this journal because I feel the onus is on the doctors for the initiative in this matter; until they are convinced that it is to their interests to give up dispensing, nothing can be done by the pharmacist.

This is a time of unrest for the medical profession, and it is just as bad for the chemist, and if you want to check our trade in patent medicines, put further restrictions on our counter-prescribing, and give us no dispensing, we shall be nothing but a disappearing quantity, but if an honourable understanding is reached we can present a united front.—I am, etc.,

PERCY NOWELL,
Pharmacist.

Harlesden, N.W., July 15th.

DIET IN THE CAUSATION OF ACNE AND BOILS.

SIR,—I have read the report in the JOURNAL of August 10th of the discussion upon acne and seborrhoea in the Section of Dermatology, at the annual meeting at Liverpool, and was interested to note the importance placed upon diet and the staphylococcus in the etiology of acne by Dr. Arthur Whitfield. It may be worth while to place on record that eggs are a frequent cause of acne or of boils (also caused by the staphylococcus). The consumption of two or three eggs, however cooked, in some subjects is followed within thirty-six hours by an attack of acne or by one or two boils; and I have known cases where abstention from eggs has resulted within a fortnight in freedom from boils, crops of which had previously succeeded one another without a break.—I am, etc.,

THOS. E. FRANCIS, M.D.Lond., D.P.H.

Llanelly, Aug. 10th.

DOCTORS IN INDIA.

SIR,—Will you allow me to add a few names to the list contained in the interesting article on "Doctors in India" that appeared in your issue of July 27th last?

At the outbreak of the Sepoy Mutiny Dr. Stewart Clark held the office of Postmaster-General of the North-West Provinces, and rendered services of the greatest importance in keeping communications open during the critical time that followed. He was also a distinguished administrator in other civil departments. He was a native of Braemar, and a life of him published in 1898—oddly and inaccurately written by his widow—received a notice in the BRITISH MEDICAL JOURNAL. Dr. John Forbes Watson, a native of Strathdon, and, I believe, a cousin of Stewart Clark, was the leading authority of his day on the industrial materials of India, especially its textile fabrics, and his writings on these subjects are classical. After his retirement from life in India he held the office of Director of the Indian Museum in London. In the obituary notice of Watson that appeared in your pages he is ranked with Sir William Jones and the other great figures of early British India. Among living Indian doctors, Sir George Watt seems to have followed in the footsteps of Forbes Watson, and is distinguished for his writings on various products of India.

Lieutenant-Colonel Ranking, late of the Indian Medical Service, a distinguished Oriental scholar, is Lecturer on Persian in the University of Oxford.—I am, etc.,

JAMES NEIL, M.D.

Oxford, Aug. 8th.

THE ARRIS AND GALE LECTURES ON SHOCK.

SIR,—It seems to be for more than one reason time that this correspondence should cease, so I will only express my regret that the authors do not understand my position and criticisms, and that no one else has joined in the discussion—and my surprise that claimants to accuracy should assign to me remarkable opinions of the existence of which I have been hitherto unconscious! For example, I am now told that I do not appreciate any significance in vasomotor variations (without reservation), whereas I merely suggested in my first letter (and gave my reasons for so doing) that they are not *necessarily and always* of great importance.—I am, etc.,

J. D. MORTIMER.

London, S.W., Aug. 10th.

Medico-Legal.

CORONERS' INQUIRIES.

A CORRESPONDENT has sent three questions as to the conduct of coroners' inquests, the nature of which will sufficiently appear from the following replies:

1. The mere fact that the deceased was a member of a society to which our correspondent was surgeon would not make it imperative that he should be called to give evidence as to the cause of death. Speaking generally, the coroner should call as medical witness the one who was, in his opinion, best qualified by his knowledge of the facts to give evidence as to the cause of death. In the case of a sudden death, where presumably no doctor had been actually attending the deceased, the one first called in immediately after death would seem to be the most valuable witness, especially if a *post-mortem* examination were necessary.

2. There is no statutory right under the Coroners Act to travelling expenses, but by Section 25 of that Act, "The local authority for a county or borough from time to time may make, and when made may alter and vary, a schedule of fees, allowances, and disbursements, which, on the holding of an inquest, may lawfully be paid and made by the coroner holding such inquest (other than the fees payable to medical witnesses in pursuance of this Act)." Most, if not all, local authorities have drawn up such a schedule, and it generally provides for payment for mileage or travelling expenses for witnesses. It would certainly be unusual if there was no provision for paying mileage in our correspondent's case, and an application from the medical practitioners of the district to the local authority would probably lead to an amendment of the schedule; this the local authority can do without legislation. We assume that the coroner had no authority to pay mileage or travelling expenses. If he had such authority and refused to exercise it in favour of our correspondent, we should be much interested in learning what reason he alleged for his refusal. The police would appear to have no duty to convey the medical witness to the place of inquest.

3. Unless the police were acting for the coroner, and under his orders, in requesting our correspondent to examine the body, the coroner would not incur any liability, or be under any obligation to call him as a witness at the inquest. In that case our correspondent's remedy is against the police, who asked him to undertake the examination. If, however, the police were acting with the coroner's authority the coroner was morally, if not legally, bound to call our correspondent. In any similar case in future the best and safest course would be to decline to do anything in the matter until the coroner issues his summons to attend the inquest. Our correspondent would then be sure at least of getting his fee of one guinea. Unless special provision is made for it in the schedule of the local authority, the coroner has no power to pay for the doctor's expenses in going to examine the body. The Government auditor would surcharge the amount so paid, and the coroner would have to refund it out of his own pocket. But, as we have pointed out, the doctor can protect himself by declining to examine the body until a summons to attend and give evidence at the inquest is actually issued or promised. Of course, no medical practitioner can be ordered by the police or any one else (except, possibly, the coroner in his summons to attend and give evidence at the inquest) to examine a dead body; and if he does examine it in pursuance of the coroner's order his right to one guinea is unquestionable, and probably he could establish his strict legal right to two guineas on the ground that he had made a *post-mortem* examination. We do not, however, advise medical witnesses to press for the two guineas unless they have made a *post-mortem* examination in the ordinary medical sense, including an examination of the brain and viscera.

ANOTHER correspondent sends us a note of a case in which the verdict of a coroner's jury was that the patient "died suddenly, whilst bathing, from natural causes, probably heart failure, due to indigestion and dilatation of the stomach." The patient was a man aged 20. Our correspondent informs us that no medical man was called at the inquest.

Without a full knowledge of the facts placed before the jury, it is impossible to say how far they were justified in their conjecture as to the "probable" cause of death. It is conceivable that the sudden death was witnessed by one or more persons, whose account of the circumstances proved that it was not caused by drowning. The jury may thus have had sufficient evidence to negative the one cause other than natural which there was any reason for suspecting. When, however, they proceed to assign a probable definite cause, they must have had some medical history of the case, or else they were acting on pure conjecture. It is possible that the deceased may have suffered from

"indigestion and dilatation of the stomach," for which he had been medically attended, and the nature of his illness may have been known to his relatives and communicated by them to the jury, thus supplying some ground for the guess in the verdict. All this is conjecture on our part, but, in the complete absence of information as to the facts of the case, we can do no more.

If there was no medical history communicated to the jury, their boldness in conjecturing "dilatation of the stomach" indicates over-confidence in their own judgement. In any case, their verdict can hardly be regarded as satisfactory by the Registrar-General. A *post-mortem* examination by a medical practitioner would have placed the verdict on a proper basis of fact, or expert opinion, instead of the conjectures of a jury of laymen.

CANDIDATURE OF COUNTY COUNCILLOR FOR CORONERSHIP.

AMIL.—A county council will in the near future elect a coroner for one of its divisions. A., who is a member of the council, contemplates resigning his seat and become a candidate for the office. Is there any legal barrier against the council electing A. to the coronership?

*** We do not think there is any legal barrier to the course proposed to be taken by A., and we rather think it has been taken more than once in previous elections to coronerships. Protests—informal in any case—have been made in some cases, but not as far as we know with success. Nor does the question ever appear to have been tested in the law courts or even by appeal to the Home Secretary. Probably the would-be protestant was advised that he could not hope to sustain his objection as a question of strict law. The Local Government Act, 1888, which is the only statute dealing expressly with this point, merely directs that the county council shall appoint "a fit person not being a county alderman or a county councillor." This appears to have been strictly construed as applying only to the position of the person elected at the time of his actual election. If the object of the restriction in the Act was to prevent the possibility of a seat on the council being improperly used as a lever to procure an appointment in the gift of the council, it cannot be said to be very effective. Perhaps, however, the object was merely to prevent the two offices being held simultaneously by the same person. That, at all events, appears to be its only effect in practice.

Universities and Colleges.

UNIVERSITY OF CAMBRIDGE.

THE following degrees have been conferred:

M.B., B.C.—A. M. Bodkin, J. S. Burn, J. W. H. Chun, M. Donaldson, R. Ellis, J. R. Marrack, C. H. G. Philp, E. Rayner.
M.B.—W. Broughton-Alcock.
B.C.—A. E. Bonny, J. W. Dew, W. J. Fison, E. F. W. Grellier, J. M. Jarvie, W. L. Johnson, C. B. Wainwright, L. M. Weeks, H. F. Wilson, C. R. Wright.

MANCHESTER UNIVERSITY.

Munificent Legacy.

UNDER the will of the late Mr. John Hall, of St. Leonard's-on-Sea, brother of the late Sir Samuel Hall, whose estate has been valued for probate at £44,978, the sum of £40,000 has been left to accumulate at compound interest and to be devoted on the death of the survivor of his two nieces to the foundation of two professorships and various scholarships at the Victoria University, Manchester. The sum of £20,000 is to be for the founding of a Samuel Hall Professorship in Chemistry, £15,000 for a Samuel Hall Professorship in Philosophy, £2,500 for not less than two Samuel Hall Scholarships in Chemistry, and £2,500 for not more than two Samuel Hall Scholarships in Philosophy, all to be held on such terms and conditions as the Council of the University with the consent of the testator's trustees may determine. The Professor of Philosophy is to deliver once in each year a free public lecture to be called the "Hall Oration of Philosophy" on the study of philosophy. In addition to the above, the residue of the testator's property will go to the Victoria University for John Hall Scholarships in such scientific subjects as the council and the trustees may decide.

QUEEN'S UNIVERSITY, BELFAST.

THE Executive Committee of the Better Equipment Fund in connexion with the university has obtained the offer of 74 acres for an athletic field for £10,100. The place is known as New Forge, and for some 2,000 feet is bounded by a canal, so that it will be possible to engage in boating as well as other sports; it stretches on the west towards the Malone Road. Formerly it was used as a polo ground. Lord Deramore has offered to sell the fee simple, and the athletic field committee, which has been searching for a suitable site for some years, strongly recommends the acceptance of the offer; £9,500 of the purchase money has been already raised, and the balance can be obtained from the Better Equipment Fund.

APOTHECARIES' HALL, IRELAND.

THE following candidates have been approved in all subjects of the examinations indicated:

FIRST HALL.—S. Stritch, S. Ram Rao, D. Campbell.
SECOND HALL.—S. Ram Rao, U. A. Kynvett-Hoff, D. Campbell.
FINAL.—C. D. Downing, J. A. M'Conochie, M. Keogh.

Public Health AND POOR LAW MEDICAL SERVICES.

DISTRICTS OF POOR LAW OFFICERS.

J. S. C. writes that he is a district medical officer, and under his contract with the guardians certain parishes are allotted to him by name. Another parish for the purpose of rating is included with these, but is not mentioned in his contract, but he is constantly receiving orders to attend paupers in the latter parish. He asks whether he would be within his rights in refusing to attend these cases on the ground that the said parish is not mentioned in his contract.

*** Under the Poor Law orders a district medical officer on his appointment must have allotted to him a specially defined district. His contract should clearly denote this, and according to the same orders he cannot be required by the guardians to attend any cases residing outside that district. If our correspondent's facts are correct—he should make quite certain that they are—he would be justified in declining to attend the cases he demurs to under his contract.

Obituary.

DR. THOMAS LAWES ROGERS died on August 7th, at his residence in Eltham, at the age of 83. He was the third son of Mr. J. W. G. Rogers, of Alvediston, Wilts. He received his medical education at St. Bartholomew's Hospital, and took the diploma of M.R.C.S.Eng. in 1853. After acting as assistant medical officer to the Rainhill County Lunatic Asylum, Lancashire, for a year, he joined the first b ttalion of the Coldstream Guards, and served throughout the Crimean War; he received the medal and clasp for his services. In 1858 he retired from the army and became medical superintendent of the Rainhill County Asylum. In 1860 he took the diploma of M.R.C.P.Lond., having taken the degree of M.D. St. Andrews in 1857. He was president of the Psychological Section of the annual meeting of the British Medical Association at Liverpool in 1883, and retired from his appointment at the asylum five years later. He afterwards did much work for the Charity Organization Society, and for the Workshops for the Blind of Kent. He joined the committee of management of the Seamen's Hospital Society in 1893, and thereafter took a most active part in the work of the society. He was one of the most regular in attendance at the board of management and at various subcommittees until his health gave way in 1909, after sixteen years of service. He then became a vice-president of the society. On the occasion of the foundation of the London School of Tropical Medicine, in 1898–9, he was a member of the committee which met at the Colonial Office to arrange the details; he was also a member of the building committee, and rendered much assistance in regard to the construction of the laboratories. He was a sanitarian with very pronounced views, and the operating theatres in both hospitals were remodelled on his advice. A memorial service was held in Eltham Parish Church on August 9th, and the funeral took place on the following day in the old churchyard.

WE regret to record the death of Dr. JAMES MILLER, of St. James Terrace, Glasgow. An Edinburgh graduate, Dr. Miller spent some years in studying sanatorium work in Nordrach-on-Dee and other places, and thereafter for a short time practised in Manchester. Some five years ago he settled in Glasgow as successor to Dr. Anderson Robertson, who relinquished his practice to enter the church. Soon afterwards Dr. Miller was attacked with enteric fever, but on his health being re-established he rapidly acquired an extensive practice. He devoted himself very largely to vaccine treatment, and was the leading exponent of Wright's methods in Glasgow. His services were in

much demand, and in several communications to the local medical societies he brought forward many interesting records which showed the benefit obtainable by vaccine treatment. Dr. Miller had just returned from a holiday when he was seized with an illness for which unfortunately an operation proved of no avail.

Deputy-Surgeon S. B. ROE, C.B., who had been in failing health for some months, died at his residence, Ballyconnell House, Cavan, on July 22nd, at the age of 82. He was the son of Mr. George Roe of Ballyconnell, and graduated A.B. with first class honours in classics at Trinity College, Dublin, and M.B. in 1855. He joined the 92nd Gordon Highlanders in the same year, and served with that regiment as Assistant Surgeon, Surgeon, and Surgeon-Major until 1882. During this period he went through the Crimean campaign, the Indian Mutiny, and the Afghan war of 1879–80. During the last mentioned campaign he took part in the action of Ali Khal and the operations around Kabul and Sherpur and the Kandahar march. For his services in this war he received the medal with two clasps and the bronze star. He served in the South African war of 1881, and in that year was made C.B. He was Principal Medical Officer of the South-Eastern District in 1885, and of the Madras District in 1886–90. After retiring from the service he settled in the place of his birth, and became Deputy Lieutenant for County Cavan; he was High Sheriff for the county in 1892–3. He was one of the three members nominated by the grand jury to serve on the county council, and for many years took an active share in the work of the county. He took much interest in the affairs of the Church of Ireland in his own neighbourhood, and succeeded in winning the affection and esteem of all with whom he came in contact in Cavan. At the petty sessions held at Ballyconnell after his decease the court adjourned as a mark of respect, and the clerk was directed to forward to Surgeon-General Roe's relatives an expression of its regret and its sense of the great loss which the Ballyconnell district had sustained by his death.

THE weather in Switzerland has so far this season been very changeable and cold. Snow has fallen to the 5,500 ft. level within the last few days, an unusual event in mid August.

THE party organized by the German Central Committee for Educational Travel to visit America will comprise about 250 German practitioners, who will leave Hamburg on September 7th. During the ten days the voyage will last lectures will be given on board.

IN a series of studies on plague by McCoy and Chapin of the Public Health and Marine Hospital Service of the United States of America (Bulletin 53) a peculiar plague-like disease occurring amongst rodents is described. It is due to a bacterium which the authors have already described in a preliminary note, and named the *Bacterium tularense*. They now report that they have isolated the organism from guinea-pigs inoculated with material from three naturally-infected ground squirrels and have recovered it on several occasions from guinea-pigs dead after inoculation from cultures. So far the organism has only been cultivated on special media. As a general rule the serum of naturally or artificially immune animals agglutinates the organism, while that of healthy susceptible animals does not; while agglutinating serum binds complement in the presence of specific antigen. The subacute or chronic lesions of this peculiar disease have a resemblance in some way to tuberculosis.

IN the *Transvaal Medical Journal* for May, 1912, Dr. Watkins Pitchford, Government Bacteriologist and Pathologist, gives a good description of scurvy as seen in South Africa. His paper was read at the Thirteenth South African Medical Congress, 1912, in the Pathological Section. Dr. Pitchford states that in South Africa in modern times scurvy appears as an endemic disease which occasionally assumes epidemic proportions. It has been, and is, very closely connected with the mining industry, and a few years ago broke out in an aggravated form in the mining compounds. Owing to increased experience the disease has of late diminished greatly in severity, but Dr. Pitchford believes that until its true nature is universally admitted, and until all are agreed upon a certain and practicable cure, the malady must remain as a perpetual menace to the prosperity of that colony. The symptoms seem to be the same as those seen in other parts of the world. Dr. Pitchford proposes to classify the disease as one of a group of diseases which cannot be defined more accurately than as a "dietetic cachexia."

Letters, Notes, and Answers.

AUTHORS desiring reprints of their articles published in the BRITISH MEDICAL JOURNAL are requested to communicate with the Office, 429, Strand, W.C., on receipt of proof.

TELEGRAPHIC ADDRESS.—The telegraphic address of the EDITOR of the BRITISH MEDICAL JOURNAL is *Aitiology, Westrand, London*. The telegraphic address of the BRITISH MEDICAL JOURNAL is *Articulate, Westrand, London*.

TELEPHONE (National):—
2631, Gerrard, EDITOR, BRITISH MEDICAL JOURNAL.
2630, Gerrard, BRITISH MEDICAL ASSOCIATION.
2634, Gerrard, MEDICAL SECRETARY.

☞ *Queries, answers, and communications relating to subjects to which special departments of the* BRITISH MEDICAL JOURNAL *are devoted will be found under their respective headings.*

QUERIES.

E. R. P. asks for advice in the treatment of a typical case of angio-neurotic oedema in a young woman aged 24 years.

R. G. H. asks for suggestions for the treatment of styes in the eyelids in a boy, aged 13, otherwise perfectly healthy; the condition has been going on for about eighteen months.

CYMRO asks for advice in the treatment of neuritis brought on by fatigue (carrying a heavy bag), in a middle-aged subject, otherwise in perfect health; certain movements of the arm are very painful.

TUBERCLE would be grateful for information as to what places in South Africa would be most suitable for a case of pulmonary tuberculosis with tendency to bronchial catarrh. The disease is practically quiescent, and the temperature is normal. He asks also for opinions as to the climate of Victoria, Australia, and of Arizona for such a case.

MOTOR BICYCLES.

A CORRESPONDENT asks for advice in the selection of a motor bicycle suitable for a medical man, easy to understand and to use in slow traffic and capable of climbing moderate hills. He desires to find a light machine, and one which will not compel the user to run alongside it before it starts.

ANSWERS.

FORWARD.—The ortol test for milk is for distinguishing milk which has been heated above 80° C. from raw milk. It consists in adding to a few c.cm. of the milk one drop of a dilute hydrogen peroxide solution, and a small quantity of a solution of ortol (a chemical chiefly used in photography as a developer). With raw milk a deep red colour is produced, but milk which has been heated above 80° gives no colour.

T. writes, in answer to "R. T. N.": Firm pressure around the thigh or upon the great sciatic nerve sometimes gives relief in cramp, which is often associated with some irritation of the stomach or of the intestines. Sodae bicarb., 3 grains, in a cup of warm water at bedtime I have found beneficial; strict attention to the bowels is necessary.

THE LIGHTING OF SCHOOLS.

I. (H. W.).—The whole subject of artificial illumination, gas and electrical, for schools and colleges is dealt with by many authorities in three sections of the volume of *The Illuminating Engineer* for 1911, pages 153–166, 203–242, and 289–298. The separate parts could probably be obtained on application to the secretary of the Illuminating Engineering Society, 32, Victoria Street, Westminster, S.W. This discussion, to which medical, educational, and engineering authorities contributed, was summarized in the BRITISH MEDICAL JOURNAL of March 25th, 1912. The respective merits of gas and electricity, as well as other illuminants, in schools are fully canvassed in a large volume entitled *Modern School Buildings*, by Felix Clay (London: B. T. Batsford, 1906).

LETTERS, NOTES, ETC.

A CORRECTION.

IN the report published in the JOURNAL on Mothersill's Seasick Remedy, it was stated, owing to an error in transcription, that the weight of the contents of each capsule was 11¼ grains. This was the weight found of the contents of the three capsules of each kind. The same error occurs on the second line of p. 233 of *More Secret Remedies*.

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